Business Manager
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Publisher
Edward Lyman Bill

INDIA RUBBER WORLD

Editor
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Assistant Editor
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Volume 97 | December 1, 1937 | Number 3

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Published monthly by Bill Brothers Publishing Corp., 420 Lexington Ave., New York, N. Y. Cable Address, ELBILL, New York. Subscription $3.00 per year postpaid in the United States and Mexico; $3.50 per year postpaid to Canada; $4.00 per year postpaid to all other countries.

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INDIA RUBBER WORLD

Published at 420 Lexington Avenue, New York, N. Y.

Volume 97 | **New York, December 1, 1937** | **Number 3**

Rubber and Asphalt Mixtures for Road Construction

D. C. Broome[1]

FOR some years there has been a demand in England for a resilient vibration absorbing roadway, and attempts to meet this demand have been made from time to time by means of rubber blocks. Several examples of this type of surfacing have met with a considerable degree of success as, for example, with the Gaisman & Cowper block. Extensive development, however, has been hindered on account of the high cost of such roads (which in several cases has been as high as $15 per square yard) and also the difficulty of finding a fixative which is really satisfactory under all practical conditions. Because of this, attention has been given by many to the possibility of incorporating rubber in asphalt or tar mixtures in order to take advantage of the reciprocal economic and technical merits of both materials.

Constructed Roadway—Dull Section Is Rubber and Asphalt—Shiny Section Is Same without Rubber

In addition to work undertaken by individual firms, considerable research has been carried on by The Rubber Growers' Association in conjunction with the London Advisory Committee for Rubber Research, The Chemical Research Laboratory, the British Road Tar Association, and Limmer & Trinidad Lake Asphalt Co., Ltd. While much of this research has not yet reached a stage when publication of results is possible, the following notes may serve to indicate some of the lines upon which work is proceeding at present.

Early Experimental Results

Some of the early work, which has been published by W. S. Davey,[2] showed that under certain conditions different types of unvulcanized rubber crumb could be dispersed in bitumen and that in some instances the presence of small proportions of rubber improved the properties

[1] Research chemist, Limmer & Trinidad Lake Asphalt Co., Ltd., London, S.W.1, England.

[2] *J. Soc. Chem. Ind.*, 55, 42T (1936).

TABLE 1. TESTS ON RUBBER ASPHALTIC CEMENTS

	Asphaltic Bitumen	Plus 1% Rubber	Plus 2% Rubber	Fluxed Trinidad	Plus 1% Rubber	Plus 2% Rubber	Plus 3% Rubber
Softening Point (R. & B.)	40° C.	42° C.	47° C.	40.5° C.	45° C.	47° C.	51° C.
Penetration @ 0° C.	16	12	11	22	14	12	9
15° C.	75	60	58	75	58	59	47
25° C.	200	150	136	203	170	142	116
30° C.	Too soft	246	205	345	235	250	180
35° C.	Too soft	300 (plus)	292	Too soft	Too soft	Too soft	240
Ductility @ 0° C.	60.0	28.0	64.0	53.8	12.5	34.0	16.5
15° C.	+100.0	+100.0	+100.0	+100.0	+100.0	+100.0	+100.0
25° C.	+100.0	+100.0	+100.0	+100.0	+100.0	+100.0	+100.0
30° C.	Too soft	+100.0	+100.0	98.0	+100.0	+100.0	+100.0
35° C.	Too soft	Too soft	Too soft	70.0	+100.0	+100.0	+100.0
Viscosity @ 0° C. (Poises)	7.8 by 10^7	16.9 by 10^7	16.9 by 10^7	9.0 by 10^7	15.4 by 10^7	14.8 by 10^7	71.8 by 10^7
15° C. (Poises)	31.8 by 10^5	47.8 by 10^5	67.6 by 10^5	23.9 by 10^5	41.8 by 10^7	51.7 by 10^5	99.0 by 10^5
25° C. (Poises)	Too soft	Too soft	Too soft	Too soft	Too soft	Too soft	Too soft
150° C. (Redwood 2)	56	117	172	61	81	225	663
Plasticity @ 0° C.	57.2%	74.9%	77.1%	84.1%	72.5%	65.4%	91.6%
15° C.	50.5%	59.5%	69.6%	47.1%	50.7%	61.4%	68.8%
Elasticity @ 0° C.	30°	62°	97°	37°	67°	75°	74°
15° C.	10°	40°	52°	15°	35°	47°	56°
Susceptibility (0 to 15° C.)	1.181	1.317	1.189	1.34	1.33	1.24	1.59
Fluidity Factor (25 to 150° C.)	72	153	238	83	109	300	756
A.V.I. (0 to 15° C.)	19.3	21.1	19.3	21.5	21.4	20.0	24.8
Flow 5 Hours @ 25° C.	2.6 cms.	1.3 cms.	0.7 cms.	3.5 cms.	2.4 cms.	2.1 cms.	1.7 cms.

TABLE 2. TESTS ON RUBBER ASPHALT MIXTURES

	1	2	3	4	5	6	7
Aggregate	93.00%	93.00%	93.00%	93.00%	92.93%	92.86%	92.79%
Latex	...	...	...	0.60	0.07	0.14	0.21
Rubber Crumb	0.57	0.57	...	...	...	...	...
Bitumen	5.12	6.43	7.00	6.40	7.00	7.00	7.00
Kerosene	1.31	...	...	...	...	...	...
Rubber % on A.C.	12	12	...	5.62	1.00	2.00	3.00
Total Mix	0.57	0.57	...	0.36	0.04	0.08	0.12
*Hardness No. @ 25° C. (Redwood)	17	17	16	26	17	17	17
45° C.	63	86	60	108	45	50	60
†Hardness No. @ 25° C. (Ball)	11	4	3	8	6	7	8
45° C.	12	10	5	11	9	10	10
‡Ball Indentation @ 25° C. 1 Min.	...	38	18	22.8	61.0	30.5	33.0
5 Mins.	...	42	80	27.9	63.5	34.7	34.3
¶Deformation @ 25° C. kgs. per Cm.²	7.97	...	...	5.62	7.83	7.45	7.80
Deformation @ 45° C.	4.51	5.34	6.08	1.78	4.08	4.05	3.41

* 100 kgs. per sq. cm. for one minute.
† 100 kgs. for one minute on one-inch ball.
‡ 400 lbs. on one-inch ball.
¶ Wilson test. See *J. Soc. Chem. Ind.*, 51, 61 (1932).

of the asphaltic cement, while in other cases the rubber had the opposite effect. Further experiments showed that many of these differences were due to variations in the temperature and period of heating of the bitumen-rubber mixture. Davey also showed that ammonia-preserved 40% latex may be easily mixed into warm bitumen, giving a stable dispersion of rubber.

TABLE 3. THE GENERAL EFFECT OF ADDING 4% BITUMEN TO VARIOUS TYPES OF BITUMEN

Bitumen Type	1	2	3	4	5
Softening Pt. (R. & B.)	Increased 25° C.	Increased	Increased 15° C.	Increased 35° C.	Increased 23° C.
Penetration @ 25° C.	Decreased 111°	Decreased	Increased 48°	Decreased 131°	Decreased 137°
Ductility @ 25° C.	.....	.....	.....	Decreased 53 cms.	Decreased 61 cms.
Viscosity @ 15° C.	Increased	Increased	Decreased 4,000 p.	Increased 55,000 p.	Increased 12,000 p.
Viscosity @ 150° C.	Increased	Increased	Increased 370 secs.	Increased 338 secs.	Increased
Plasticity @ 15° C.	Increased	Increased	Decreased 15%	Increased 31%	Decreased 26%
Elasticity @ 15° C.	Increased	Increased	Increased 1%	Increased 40%	Increased 50%

Rubber-Asphalt Cements

A convenient method of preparing rubber-asphaltic cements was found to consist in dissolving the rubber in a light flux oil and then cutting back the bitumen with this rubber-oil flux. Further work, carried out by means of tests upon various types of rubber-asphaltic cements, and also upon mixtures of these with mineral aggregate (see below) showed the following points of interest:

1. Suitable rubber crumb may be employed, in which case it is not essential for it to be dissolved in the asphaltic cement.

2. Better results are obtained if the light flux (kerosene) can be omitted.

3. If the kerosene is omitted, the rubber may be incorporated in a low-temperature paving mixture by simply mixing with the other constituents in one stage.

4. Alternatively, rubber may conveniently be incorporated in latex form—again by simply mixing with the other ingredients of the paving mixture.

5. Much smaller quantities of rubber are necessary to produce a given effect if added in latex form.

6. Asphaltic cements with latex rubber show considerable improvements over corresponding asphaltic cements without rubber, particularly in respect to a reduction in the tendency to flow.

7. Mixtures embodying rubber in conjunction with a fluxed Trinidad Asphalt are less temperature sensitive than corresponding mixtures made with asphaltic bitumens.

The above points may be illustrated in so far as they refer to the asphaltic cements by the typical figures shown in Table 1.

Mineral Aggregate Mixtures

As mentioned above, tests have also been carried out on mixtures with mineral aggregate, just as they would be laid on the road. These were made with ⅛-inch-dust granite coated with the asphaltic cement at a temperature of 70 to 75° C. Details of typical test results on mixtures

of this type are given in Table 2.

Examination of Table 2 will show certain anomalies, and this difficulty has characterized all the extensive mechanical tests carried out on asphalt mixtures of this type —irrespective of the presence or absence of rubber. This appears to be due to slight variations in the sieve analysis of the aggregates employed and to the fact that many of the test results are probably dependent more on the interlocking of the aggregate particles than upon relatively small differences, in the composition of the "binder." This does not mean that these mechanical tests are useless, but that they are only of value in settling broad issues and should not be used to investigate the effect of minor factors.

Laying Rubber and Asphalt Mixture

TABLE 4

Asphaltic Bitumen 100 Gms. Plus 25,000 Sq. Cms. Filler

	Asphaltic Bitumen	Cement	Granite	Limestone	Slate	Silica
Softening Pt. (R. & B.)....	38° C.	42° C.	40° C.	42° C.	42.5° C.	38°C.
Penetration @ 15° C.....	72	66	61	68	67	66
@ 20° C.....	115	100	98	112	109	110
@ 25° C.....	204	186	176	198	187	209
@ 30° C.....	395	307	268	325	304	326
Viscosity @ 15° C.....	1,990	2,388	3,383	2,388	2,189	3,383
Plasticity @ 15° C.....	31.5%	32.8%	44.4%	36.6%	28.7%	52.5%
Elasticity @ 15° C.....	30°	30°	21°	27°	22°	31°

Asphaltic Bitumen 98 Gms. Plus Rubber 2 Gms. Plus 25,000 Sq. Cm. Filler

	Asphaltic Bitumen +2% Rubber	Cement	Granite	Limestone	Slate	Silica
Softening Pt. (R. & B.)....	44° C.	45° C.	46° C.	44.5° C.	45° C.	47.5° C.
Penetration @ 15° C.....	61	55	51	58	54	58
@ 20° C.....	98	84	80	94	90	86
@ 25° C.....	178	145	142	170	166	147
@ 30° C.....	250	218	226	242	247	243
Viscosity @ 15° C.....	2,189	6,368	6,368	4,776	4,975	6,368
Plasticity @ 15° C.....	13.8%	64.2%	59.0%	56.9%	52.4%	67.6%
Elasticity @ 15° C.....	40°	44°	42°	44°	43°	47°

Rubber and Bitumen

Investigation of the effect of adding rubber to different types of bitumen has also produced some interesting results. Five typical classes of bitumen have been studied in this connection and were all of approximately 200° penetration at 25° C.

1. A "straight-run" asphaltic bitumen.
2. A "straight-run" asphaltic bitumen in conjunction with Lake Asphalt.
3. An "oily" bitumen.
4. A "semi-blown" bitumen.
5. An oil-fluxed Lake Asphalt.

The results of a considerable number of tests are typified by the summary given in Table 3, from which and from other data too voluminous for inclusion in this paper it has been shown that:

1. The softening point is invariably raised by the addition of rubber, bitumen (4) showing the greatest increase of softening point; while the very oily bitumen (3) is least affected in this respect.

2. In general, as the rubber content is increased, the penetration (at, say, 25° C.) is decreased. The reverse, however, is observable when rubber is added in more than minute proportions to bitumen (3).

3. The addition of rubber does not materially reduce the ductility of the original bitumen except in the case of materials (4) and (5), but ductility test results are incomplete owing to many of the test specimens possessing ductility in excess of the range of the apparatus.

4. When tested at normal atmospheric temperatures by the twisting cylinder method, some extremely high viscosity figures were obtained. It was found that at, say, 15° C. the introduction of rubber resulted in material increase in viscosity in all cases except material (3). Curiously, when viscosity tests are carried out in a Redwood 2 instrument at 150° C. the anomalous behavior of material (3) is no longer apparent.

5. Plasticity follows in general the atmospheric temperature viscosity tests.

6. The elasticity figures show no anomalies, the blown bitumen mixtures exhibiting the highest degree of elasticity. They are closely followed in this respect by the oil-fluxed Lake Asphalt blends.

Considering these results as a whole, the best mixtures appear to be those of the type (4) made with a proportion of blown bitumen. This shows the best results with regard to: softening point, elasticity, plasticity, viscosity.

This is particularly interesting as, in non-rubber work, the use of any appreciable proportion of blown bitumen is regarded as unsound owing to the low ductility of the latter material and its general brittleness at low temperatures. When, however, a semi-blown bitumen (or a blown bitumen plus a straight-run bitumen) is blended with rubber, these disadvantages disappear, and an extremely tough mixture results having a good ductility and plasticity over a wide temperature range.

Flow Properties

One of the most interesting points arising out of this work is the change in flow properties. The practical significance of this is that a high viscosity, low temperature sensitive mixture will inevitably show a less tendency to "flush up" on the road, and if the original specification of the mixture is such as to give a non-skid surface, there is a fair degree of certainty that it will remain in a similar condition. The whole question of flow properties is now being investigated more thoroughly with the aid of a specially constructed rotating cylinder viscometer along the lines originally suggested by Couette.[3] The present apparatus is suitable for the determination of the viscosity in absolute units of rubber-bitumen mixtures such as are referred to above at any temperature from 0° C. to 60° C. This is equivalent to viscosities of the order of 500 to 1,000,000,000 poises.

This part of the research is still in the early stages and

[3] *Ann. Chem. Phys.*, 6. 21 and 433 (1890).

it is hoped to publish some of the results obtained at a later date.

Selection of Aggregates

Another matter of considerable importance in the design of rubber asphalt mixtures such as those discussed here is the choice of suitable aggregate. A simple and practical measure of the interfacial tension between rubber-asphaltic cements and different classes of mineral matter has been obtained by tests on mixtures of asphaltic cements and various types of mineral filler. To date the following have been investigated in this way: silica, limestone, granite, slate, and cement. Allowances have been made for differences in grading by determining the specific surface of the samples used, and the figures in Table 4 are typical of the results obtained.

From a study of the figures in Table 4 it will be seen that the types of mineral tested may be placed in the following order of merit, judging according to the extent of the effect upon the properties of the original rubber asphaltic cement: silica, cement, granite, limestone, slate.

This particular order is interesting as it is also the order of increasing "basicity" of the minerals.

It is, of course, somewhat uncertain exactly how far tests of this nature indicate the relative degree of adhesion between these particular "binders" and aggregates, and some more direct determination of this property is to be undertaken.

Hot Rolled Mixtures

In addition to tests on rubber-asphaltic cements, and on finished asphalt mixtures of the "low temperature" type already referred to, some work has been carried out on the possibility of incorporating rubber into hot rolled asphalt mixtures of the voidless sand carpet type. Here the temperature sensitivity of the rubber is a serious factor, but this difficulty may largely be overcome by adding the rubber in latex form to the previously coated aggregate. In this way the length of time during which the rubber is maintained at an elevated temperature is reduced to an absolute minimum.

A number of experimental stretches of road have been laid in London and in the South of England along the lines referred to above, and are nearly all giving very good service under practical conditions.

Non-Skid Road Surface

The prime object of these trials is not to produce a mixture with a longer life than ordinary asphalt surfacings, but to maintain a "sandpaper" type of surface in a non-skid condition over a long period. Many asphalt mixtures tend to "close up" and become slippery under the action of traffic within a relatively short time, but the rubber-asphalt mixtures referred to here show signs of maintaining their non-skid texture (without the use of large aggregate) indefinitely owing to the lower flow tendency of the rubber asphaltic cement. These sections have included various types of warm and hot mixtures, also material manufactured under Dussek's patent.[4]

Satisfactory Installation in 1935

Some idea of a typical section which has proved satisfactory may be gained from the following notes regarding a road laid in May, 1935:

The mixture consisted of a specially graded igneous rock aggregate coated with a rubber-bitumen asphaltic cement. The largest particle of aggregate was ¼-inch, and the proportions were as follows:

Rubber Asphaltic Cement	6.0%
Aggregate	94.0%
	100.0%

The aggregate was dried and heated to a temperature of approximately 120 to 130° F. and coated in a mechanical mixer of the pug-mill type with the rubber asphaltic cement previously heated in a bitumen boiler of normal type to a temperature of 170° F. The average time of mixing per batch was three minutes; the material then was dropped into lorries and transported to the job. Here it was dumped on to steel plates and thence shoveled and raked into position on the base (water-bound gravel, treated with emulsion) so as to give a consolidated thickness of ½-inch. The abutments (concrete curb) were previously painted with a thin coating of bituminous paint, and the raked mixture was tamped with warm tampers along the joints. The main portion of the mixture was rolled with a 32 cwt. three-wheeled roller and subsequently, until thoroughly compacted, with a seven-ton tandem roller. The mixture was laid at a temperature of 120° F., and the road was opened to traffic immediately when rolling was finished.

[4] British patent No. 465,598, May 10, 1937.

"Rubber Lung" for Paralysis Victim

YOUNG Fred Snite, Jr., of Miami, Fla., with his chest and abdomen paralyzed by infantile paralysis in China, who has been confined for 19 months in an "Iron Lung," is looking forward to the arrival of the "Rubber Lung" especially designed and built by the General Tire & Rubber Co. With only his thorax and abdomen covered by this respirator it is hopefully anticipated that he will soon be able to lie on a comfortable bed or even sit up and have his arms

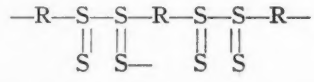
and legs, previously held inert, now free for massage and exercise so as to expedite recovery of strength to fight his affliction. This Stille-Scanlan respirator consists of a cuirass of aluminum, made to fit closely to the body by rubber fittings tapering from hard rubber down to ultra-soft sponge rubber which lies directly against the patient's body and which helps to form the partial vacuum which lifts and lowers the helpless chest muscles.

Permeability of Organic Polysulphide Resins to Hydrogen[1]

Theron P. Sager

A CHARACTERISTIC of balloon and airship fabrics which is of prime importance is that they shall be gas-tight, or nearly so. The tendency of hydrogen and helium to diffuse through thin membranes of rubber provides the incentive for the study of the behavior of a large number of film-forming materials in a search for a more satisfactory material. Considering all of the requirements involved in this application, the permeability of the group of synthetic polymers which are characterized by elastic extensibility has been of particular interest.

The general reaction between organic dihalides, having $-CH_2Cl$ terminals, and inorganic polysulphides has been shown to yield products which in many cases are characterized as rubber-like. The structure is represented as



with the added possibility that the coordinately linked sulphur may be in a *trans* rather than a *cis* arrangement. It is of interest that certain of these products exhibit elasticity, both when the amount of sulphur is confined to that representing the disulphide linkages and when the primary molecule contains sulphur in excess of these linkages.

Among these the product resulting from the reaction between dichloroethane and sodium polysulphide attracted particular interest since it not only exhibited a high impedance to hydrogen, but possessed other desirable physical characteristics as well.

There were, however, several objections to the use of polyethylene polysulphide for this purpose. This material cannot be dispersed in suitable solvents and has a distinctive and unpleasant odor. With the extension of this general reaction to include other organic dihalides and the production of materials capable of being dispersed in solvents to form cements, their utility was greatly enhanced. The odor of these products is moreover much less offensive.

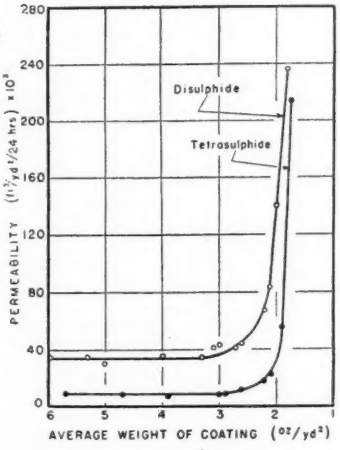


Fig. 1. Permeabilities of Coated Fabrics

Permeabilities of Films Unsupported by Fabric

In Table 1 are presented the permeabilities to hydrogen obtained with unsupported films of different thicknesses. The organic polysulphide products represent the disulphide and tetrasulphide derivatives obtained from the reaction between 2, 2′-dichloroethyl ether and sodium polysulphide. Values obtained with films of rubber of approximately corresponding thicknesses are included for comparison.

The specific permeability, or the volume of gas passing through a unit area of a material of unit thickness in unit time, was calculated by means of the equation $P=Vd/At$, in which P is the specific permeability, V the volume of hydrogen in cubic centimeters, d the thickness in centimeters, A the area in square centimeters, and t the time in minutes.

Table 1. Permeabilities to Hydrogen of Unsupported Films

Average Thickness		Permeability		Specific Permeability
Cm.	In.	1/m²/24 Hr.	Ft.³/Yd.²/24 Hr.	
		Disulphide Derivative		
0.030	0.012	0.6	0.018	12.5
.025	.010	.8	.024	13.8
.017	.007	1.4	.041	16.2
.015	.006	1.5	.044	14.6
.011	.004	2.2	.065	16.8
		Tetrasulphide Derivative		
0.033	0.013	0.2	0.006	4.5
.024	.010	.4	.012	6.6
.019	.008	.6	.018	7.9
.016	.006	.8	.024	8.8
.009	.004	1.2	.036	7.5
		Rubber		
0.030	0.012	10.0	0.295	208
.025	.010	14.2	.419	246
.018	.007	20.0	.590	250

The values obtained with both the disulphide and tetrasulphide derivatives are much lower than those with corresponding thicknesses of rubber, and those of the tetrasulphide product are consistently lower than those of the disulphide derivative.

Permeabilities of Coated Fabrics

The values given in Figure 1 represent the permeabilities obtained on a fabric coated with different weights of the two polysulphide resins which were employed in the determinations of the permeabilities of unsupported films. The cloth employed was that designated as *HH* balloon

(*Continued on page* 53)

[1] Presented as part of the Symposium on Organic Plastics before the Division of Paint and Varnish Chemistry at the ninety-third meeting of the American Chemical Society, Chapel Hill, N. C., Apr. 12 to 15, 1937. Abstracted from Research Paper RP1020, Part of *J. Res. Nat. Bur. Standards*, Aug., 1937, U. S. Department of Commerce, National Bureau of Standards.

Distributers' Tire Stocks

In the United States, October 1, 1937[1]

THE results of the quarterly survey of retail stocks of automobile tires and inner tubes, as of October 1, 1937, are shown below in comparison with summary data for preceding surveys, the bases and methods described in the report of the July 1, 1937, survey[2] having been used in calculating the stocks held by the following three groups of distributers: 1. Dealers holding over 100 casings each on April 1, 1937. 2. Distributers through oil-company chains and some independent filling stations. 3. Manufacturer-owned, mail-order house, and other large retail chains.

The following summary table, with comparative estimates of total stocks held by the three groups of distributers covered in these surveys, shows stocks of casings on October 1, 1937, 1% lower than on the same date in 1936; while stocks of inner tubes are lower by nearly 11%. Stocks of both casings and inner tubes held by these distributers were sharply reduced during the third quarter of 1937.

	Thousands of Casings			
1936	Dealers	Oil Companies	Other	Total
April 1	2,321	1,543	1,890	5,754
October 1	2,179	1,757	2,110	6,046
1937				
April 1	2,465	1,853	2,304	6,622
July 1	2,161	1,996	2,299	6,456
October 1	1,929	1,774	2,289	5,992

	Thousands of Inner Tubes			
1936	Dealers	Oil Companies	Other	Total
April 1	3,000	2,040	1,902	6,942
October 1	2,710	2,097	2,228	7,035
1937				
April 1	3,155	2,019	2,170	7,344
July 1	2,602	1,960	2,129	6,691
October 1	2,268	1,957	2,038	6,263

Stocks of dealers holding less than 100 casings each are not included in these estimates; the number of tires held by such smaller dealers is estimated by trade statisticians to range between one million and one-and-a-quarter million, at different seasons.

Dealers Reported Stocks

The following table compares the stocks reported by 1,290 dealers for 1,758 stores in the current survey, with the stocks reported by the identical firms in the survey of July 1, 1937, when their stores numbered 1,726. These dealers are divided into three groups, and the decline in stocks during the third quarter of 1937 was characteristic of each. Additional reports, received from dealers who did not report July 1 stocks, are also included to show total stocks reported by dealers in the October 1 survey.

Number of Casings October 1	Number of		July 1, 1937		October 1, 1937	
	Dealers	Stores	Casings	Tubes	Casings	Tubes
Up to 200	804	930	104,027	136,207	88,780	123,023
200 to 499	324	499	106,464	131,016	96,424	117,153
500 and over	162	329	241,192	277,611	217,720	252,635
Total	1,290	1,758	451,683	544,834	402,924	492,811
Other October 1	343	533	.....	.....	121,387	123,898
October 1 totals	1,633	2,291	.....	.....	524,311	616,709
Index numbers derived	....	....	96.1	115.6	85.7	100.8

Oil Company Distributers' Reported Stocks

Reports were received from 42 firms distributing tires through chains of filling stations and sometimes also through independent stations, and serving 40,058 outlets. Of these firms 36 reported data both for July 1 and October 1, but in order to prevent possible disclosure, only totals are reported below for October in comparison with July. Comparison of data reported by identical firms in July and October yields the index numbers for October in comparison with July, as shown in the table. A considerable decline in stocks of casings held by these distributers is indicated for the third quarter of 1937, but a very slight decline (see index numbers) in stocks of inner tubes.

	Reported Stocks	
	July 1	October 1
Number of firms	37	42
Number of outlets	41,505	40,058
Casings	1,244,562	1,112,344
Inner tubes	1,221,032	1,227,930
Index numbers:		
Casings	121.0	107.5
Inner tubes	118.8	118.6

Other Mass Distributers' Reported Stocks

Reports were received from six tire manufacturing companies covering stocks held in company-operated retail outlets and from six other mass distributers covering their total stocks on hand as of October 1. Stocks reported here by manufacturers are presumably also included in manufacturers' inventory as reported by The Rubber Manufacturers' Association, Inc.; such stocks cannot be separately shown here without possible disclosure of confidential information. The number of stores reported by tire manufacturers for October was 1,995; other firms 1,763. Reported stocks of casings were practically unchanged, but there was a noticeable decline in stocks of inner tubes held by this group of distributers at the end of the third quarter of 1937.

	Reported by Identical Firms	
	July 1	October 1
Number of firms	12	12
Number of stores	3,713	3,758
Casings	2,286,389	2,274,575
Inner tubes	2,118,025	2,029,335
Index numbers:		
Casings	114.9	114.4
Inner tubes	106.4	101.9

Acknowledgment

The support of The Rubber Manufacturers' Association, Inc., the assistance of the National Association of Independent Tire Dealers, and the cooperation and promptness of dealers, oil company distributers, manufacturers, and other mass distributers, in submitting data used in this report covering 46,107 retail outlets, is gratefully acknowledged.

[1] Special Circular No. 3,657, Rubber Section, Department of Commerce, Bureau of Foreign and Domestic Commerce, Washington, D. C.
[2] India Rubber World, Oct. 1, 1937, pp. 46, 49.

Softening Agents in Neoprene[1]

Howard W. Starkweather and Herbert W. Walker

TABLE 1. EFFECT OF FF WOOD ROSIN ON PROPERTIES OF NEOPRENE

Neoprene Type E	100
Soft Carbon Black	200
Wood Rosin	X
Extra-Light Calcined Magnesia	10
Zinc Oxide	10

Stock No.	Wood Rosin Amount per 100 Parts Polymer	Plasticity-Recovery in 1/1,000-Inch after Aging at 50° C. for 0 Hrs.	24 Hrs.	48 Hrs.	96 Hrs.	Cure Min. at 153° C.	Tensile Kg./Cm.[2]	Strength (Lbs./Sq. In.)	% Elongation at Break	Hardness Shore Durometer Type A	Non-Volatile Gasoline Extract in % of Stock Taken After 48 Hrs.	144 Hrs.	% Vol. Increase after Gasoline Immersion for 48 Hrs.	144 Hrs.
1	0	400-45	455-	..	..	10	...	....	...					
						20	123	(1,750)	160	95	0.44	...	27	..
						40	135	(1,925)	150					
2	5	309-22	343-39	324-37	378-48	10	121	(1,725)	220					
						20	118	(1,675)	150	93	0.55	...	29	..
						40	128	(1,825)	140					
3	0	380-45	410-75	442-	..	10	111	(1,575)	200					
						20	130	(1,850)	190	93	0.37	0.41	27	28
						40	146	(2,075)	175					
4	2	342-30	388-40	381-44	426-59	10	112	(1,600)	230					
						20	127	(1,800)	160	95	0.44	...	26	..
						40	128	(1,825)	160					
5	5	299-21	309-37	328-39	355-47	10	118	(1,675)	200					
						20	118	(1,675)	200	93	0.38	0.48	28	29
						40	121	(1,725)	180					

SOFTENING agents are added to Neoprene[2] as well as to the natural rubber to plasticize heavily pigmented stocks. This paper presents data on the influence of typical representatives of the common classes of rubber softening agents in a carbon black Neoprene stock. The amount of softener is restricted to 10 parts per 100 parts of Neoprene. For some purposes where extreme softness is desired, large amounts of such materials as Factice find extensive application, but these especially soft stocks are not considered in this general evaluation. The softening agents were also tested in gum stocks, but, since the results differed only in degree from those obtained with the carbon black stocks, it has seemed unnecessary to include both sets of data.

Current plant production of Neoprene Type E was used in all of these tests. A.S.T.M. methods were used in the preparation of the samples and in obtaining stress-strain data.

The plasticizing action of the softeners was indicated by the original plasticity-recovery numbers in 1/1,000-inch as determined at 70° C. on a 2 cc. pellet with the Williams parallel plate plastometer.[3, 4]

The stability[3] of the compound was shown by the change in plasticity-recovery numbers after aging at 50° C.

An estimation of the retention of softness and tack by the compounded, uncured stock during storage at room temperature was obtained by a periodic measurement of the hardness of the stock with a Shore Durometer, Type A. It was found that there was a definite relation between this hardness reading and the ease with which stocks could be processed after room temperature storage, without remilling or heating. The hardness eight days after slabbing from the mill was taken as an arbitrary measurement of this retention of softness.

The hardness of the slab cured for 40 minutes at 153° C. was determined with a Shore Durometer, Type A.

Water and kerosene absorption values were calculated on a volume basis from the increase in weight of a specimen after 48 hours' immersion at 100° C. The kerosene used was obtained from the Pure Oil Co. (Specific gravity, 0.8124 at 15.5° C. Iodine No. 10.4).

The gasoline extractable, non-volatile matter was determined because it is important that gasoline should not extract material from gasoline hose which would leave a gummy residue on evaporation. This non-volatile, gasoline extract was determined by the procedure outlined by the Underwriters' Laboratories. A ten-gram sample of the cured Neoprene compound, 0.075-inch thickness, was weighed, cut in half, and placed in a 4-ounce Bakelite screw cap bottle (minus the paper lining in the cap) containing 50 cc. of aviation grade gasoline (No. 73 from Standard Oil Co. of New Jersey, specific gravity, 0.714). After 48 hours' immersion at room temperature (approximately 25° C.) the sample was weighed to determine the swelling, and the gasoline poured into a weighed evaporation beaker. The bottle was rinsed with a fresh 15 cc. portion of gasoline which was combined with the main portion. The gasoline was evaporated to dryness under an air-jet according to the A.S.T.M. procedure D-381-36. A blank test was conducted, in which the same amount of standard gasoline was allowed to stand 48 hours and then evaporated in the same manner, and a correction applied to the weight obtained in the test. The residues are reported as per cent. of the weight of the compound taken. The Underwriters' specifications state that this residue shall not exceed 1.5%.

The per cent. volume increase after gasoline immersion was calculated from the gain in weight and specific gravity of the stock, and the specific gravity of the gasoline.

[1] Contribution No. 35 from Jackson Laboratory, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. Paper presented at the ninety-fifth meeting of the American Chemical Society, Rochester, N. Y., Sept., 1937.
[2] Bridgwater and Krismann, *Ind. Eng. Chem.*, 25, 280 (1932); E. I. du Pont de Nemours & Co., Inc., "The 'DuPrene' Manual," Aug., 1934.
[3] Starkweather and Walker, *Ind. Eng. Chem.*, 29, 872 (1937).
[4] Williams, *Ind. Eng. Chem.*, 16, 362 (1924).

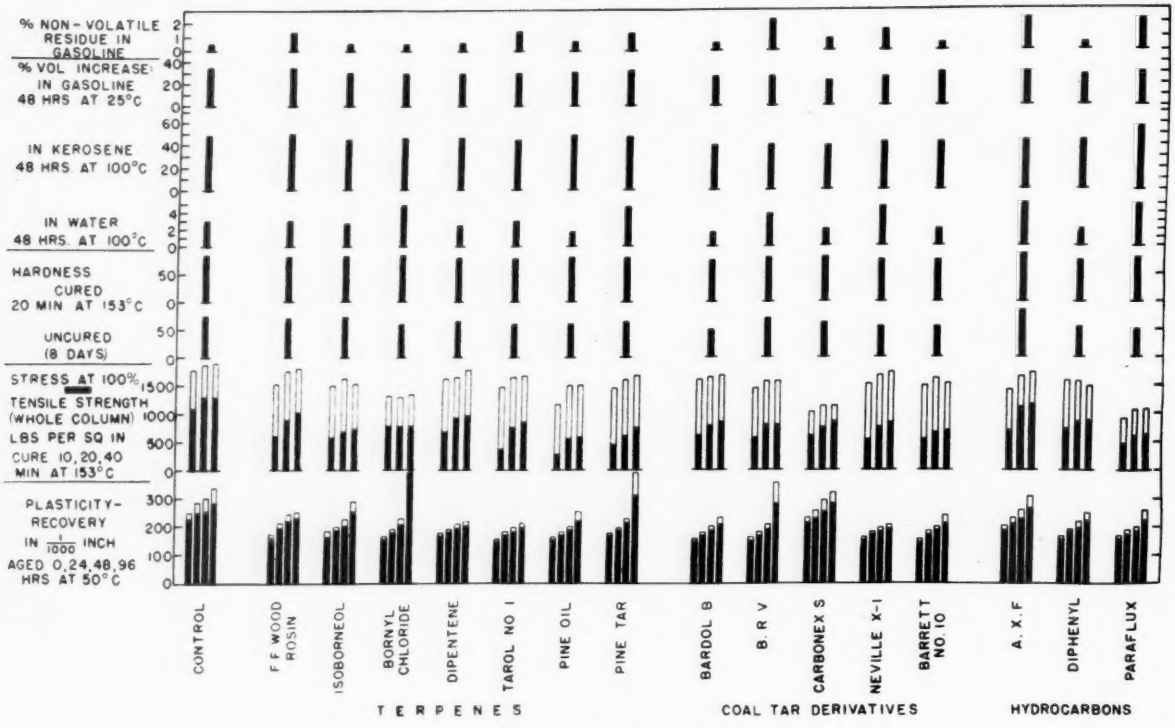


FIGURE 1

EFFECT OF SOFTENERS ON PROPERTIES OF NEOPRENE
100 NEOPRENE TYPE E, 150 THERMAX, 5 FF WOOD ROSIN,
10 MgO, 10 ZnO, 10 SOFTENER.

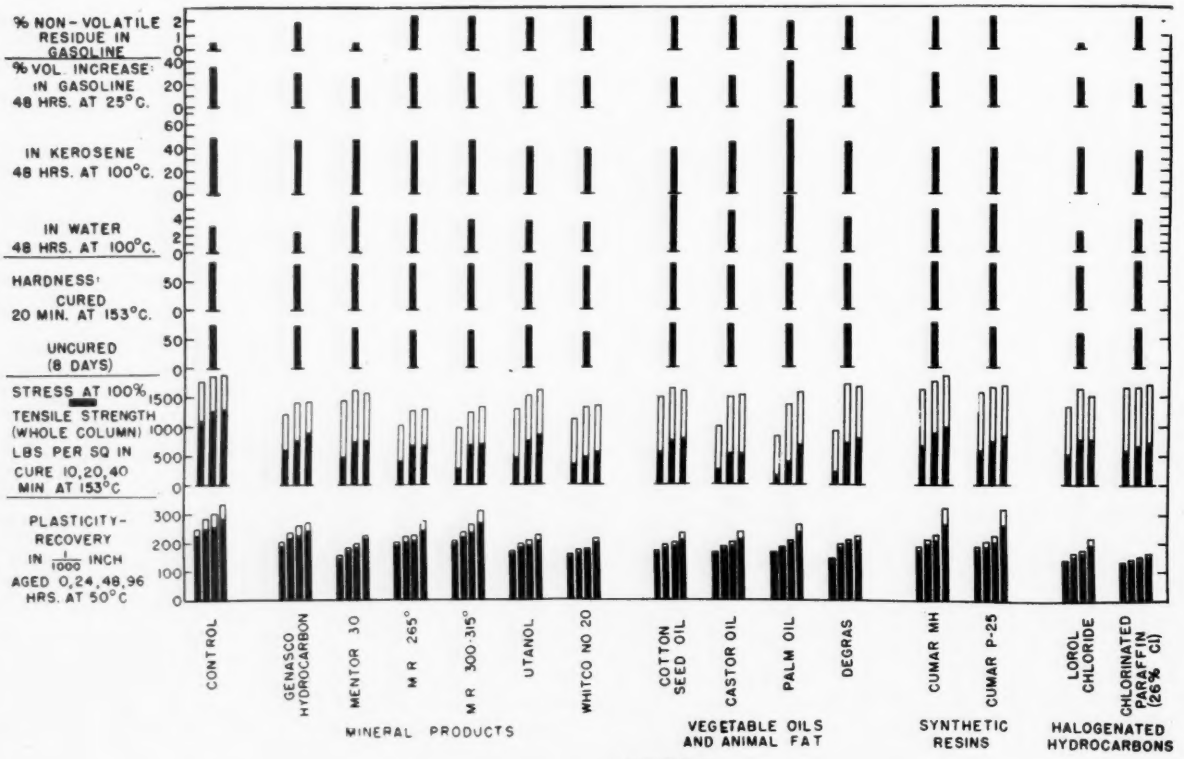


FIGURE 2

EFFECT OF SOFTENERS ON PROPERTIES OF NEOPRENE
100 NEOPRENE TYPE E, 150 THERMAX, 5 FF WOOD ROSIN,
10 MgO, 10 ZnO, 10 SOFTENER

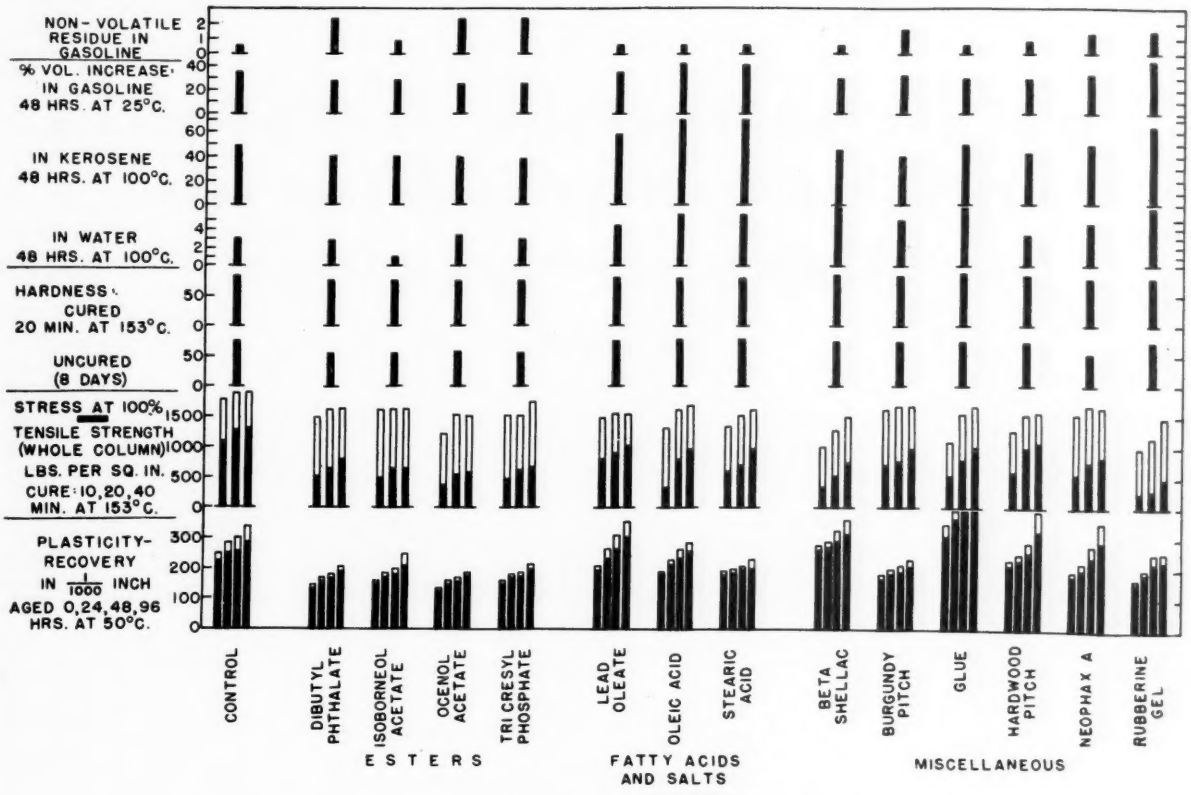


FIGURE 3

EFFECT OF SOFTENERS ON PROPERTIES OF NEOPRENE
100 NEOPRENE TYPE E, 150 THERMAX, 5 FF WOOD ROSIN,
10 MgO, 10 ZnO, 10 SOFTENER

Preliminary to the investigation of the various softeners, experiments were conducted to determine the effect of wood rosin which was to be used in the general formula for comparing softeners. Results of these experiments are shown in Table 1. Two sets of data are included to show variations that might be expected from the use of different lots of Neoprene. Stocks No. 1 and 2 were made from one factory lot of Neoprene; while Stocks No. 3, 4, and 5 were from another lot.

The general formula used for the comparison of the softeners was

Neoprene Type E	100
Soft carbon black	150
FF wood rosin	5
Softener	10
Extra-light calcined magnesia	10
Zinc oxide	10

Thermax was used in the test recipes as a representative soft carbon black. The magnesia-zinc oxide accelerated stock is commonly used in practice. Five parts of FF wood rosin have some softening action, but were included because rosin improves the stability of carbon loaded compounds and has found use in a wide variety of practical stocks. As shown in Table 1, this amount of rosin did improve the stability, but did not affect the non-volatile gasoline extract.

The results of the tests are given in Figures 1, 2, and 3, in which the softeners are listed according to chemical classes. The order in which the various classes are arranged has no significance. In many cases the softening agents are identified by their trade names. Descriptions of the properties of these commercial products are given in "Compounding Ingredients for Rubber"[5] compiled by the editors of INDIA RUBBER WORLD.

It is apparent from the figures that the stability of the uncured stocks containing the plasticizers is, in general, good.

The influence of the softeners on the stress-strain properties varies, and, based on the 20-minute cure, the agents which soften the raw stock to a marked degree can be classified as follows:

Relatively High Modulus	Low Modulus	Low Modulus and Low Tensile Strength
Bardol B	Barrett No. 10	Paraflux
B.R.V.	Castor oil	Rubberine Gel
Cotton seed oil	Ocenol acetate	Witco No. 20
Diphenyl	Palm oil	
Lorol chloride	Pine oil	
Mentor 30	Tricresyl phosphate	
Neville X-1		
Tarol No. 1		
Utanol		

Softeners which aid in keeping raw stocks soft and tacky during storage are:

Bardol B	Neville X-1
Barrett No. 10	Ocenol acetate
Bornyl chloride	Paraflux
Dibutyl phthalate	Pine oil
Diphenyl	Pine tar
Isoborneol acetate	Tarol No. 1
Lorol chloride	Tricresyl phosphate
Neophax A	Witco No. 20

The apparent decreased absorption of water, kerosene, or gasoline is influenced by the fact that some of the softeners are extracted by the solvent or lost by evaporation under the conditions of the test. In this preliminary investigation it was not considered necessary to examine this in more detail, but in a more exact evaluation for specific purposes this possible loss of softeners under

(*Continued on page* 50)

[5] INDIA RUBBER WORLD, "Compounding Ingredients for Rubber," 1936.

The Reaction of Ammonia and Sulphur Chloride in Rubber Solutions[1]

F. B. Menadue[2]

IF A small quantity of sulphur chloride be diluted with a solvent such as petroleum naphtha, and ammonia gas be passed through the mixture, the usual precipitate consisting principally of ammonium chloride is formed according to the usually accepted equation

$$6\ S_2Cl_2+16\ NH_3=N_4S_4+8S+12\ NH_4Cl.$$

If to the petroleum solution of the sulphur chloride a quantity of rubber solution be added, a precipitate does not form on the addition of the ammonia gas, but if, however, the sulphur chloride is increased above a certain percentage, a precipitate again forms on the adding of the ammonia, but this time of an entirely different type.

Sulphur is thus spontaneously combined with the rubber, and the precipitate contains essentially, the rubber sulphur product, a rubber nitrogen sulphide product, a small amount of S_2Cl_2-rubber additive product, ammonium chloride, free sulphur, and nitrogen sulphides. With the necessary amount of S_2Cl_2 the rubber sulphur product may be obtained containing over 32% combined sulphur, which ordinarily requires for its production the heating of mixtures of sulphur and rubber together at high temperatures for long periods.

Experimental Methods

Precipitation was carried out by two different methods. In one the precipitation was made by adding the whole of the S_2Cl_2 to the solution of rubber in benzine, and immediately passing NH_3 gas through at a definite rate until the whole or the S_2Cl_2 was reacted with, up to five minutes being required.

In the other method the concentration of sulphur chloride in the solution was kept very low with the object of insuring that when high percentages of S_2Cl_2 were used, its direct action on the rubber was kept at a minimum. The S_2Cl_2 was added in lots of 0.15-gram and the NH_3 inflow controlled so that an excess of an approximate "mean" of 0.1-gram of S_2Cl_2 was maintained. The rate of NH_3 was four ml. per second; the time of entry was about three minutes per gram of S_2Cl_2.

Two separate methods were used for treating the precipitate. In the first method, which was used for both high and low sulphur products, the ammonium chloride, nitrides, and free sulphur were separated from the "original precipitate" with NaOH solution

The second method was carried out by extraction with water to remove NH_4Cl, etc., and acetone to remove free sulphur and residual nitrides. This method was confined to high sulphur content precipitates.

Properties and Composition

The "original" precipitates were bulky and gelatinous with the lower amounts of S_2Cl_2, but, nevertheless, sharply defined from the supernatant liquid. This gelatinous character changed to flocculent and granular with the higher percentages of S_2Cl_2.

The "treated" precipitate varied from the stage of soft elastic properties of ordinary vulcanizates to that of ebonite powder, this change corresponding with the increase in the sulphur chloride used, and, therefore, as will be seen, the combined sulphur.

Experiments were carried out on the product of the second precipitation method which insured the minimum of S_2Cl_2 direct action product. Treatment was done by water and acetone extraction which therefore included all sulphur insoluble in 60 hours' extraction in acetone.

Considerable variation was evident in the yield of treated precipitate and sulphur content. The following table shows the average analyses of the products obtained from three sets of experiments, each set comprising three experimental lots.

Experiment	% Sulphur	% Chlorine	% Nitrogen
1.....	33.8	0.53	2.17
2.....	30.8	0.6	2.5
3.....	39.2	0.7	2.8

Extraction in acetone an additional 40 hours removed only 1.5% extract, mainly nitrogen sulphide, from the last mentioned.

Various Factors in the Formation of Precipitate

From a series of tests it was found there was an exponential increase in "treated" precipitate with concentration of S_2Cl_2; and also with concentration of S_2Cl_2 and rubber, i.e., reduction in solvent. The percentage of sulphur increased with this increase in the "treated" precipitate.

The rate of inflow of the ammonia gas considerably affected the amount of precipitate formed, the amount being reduced as this rate increased. Also, when the solution was first saturated with NH_3, and an excess of the latter maintained, adding the S_2Cl_2 in small portions, a precipitate still formed, but in reduced quantities—with the one given amount of S_2Cl_2—from that when a small excess of S_2Cl_2 was maintained. Therefore it appears the amount of precipitate varies, the amount of S_2Cl_2 being constant inversely to the amount of free ammonia present.

It was proved that the presence of the rubber during the actual reaction of the sulphur chloride and the ammonia is necessary for the formation of the rubber precip-

(*Continued on page* 50)

[1] Abstracted from "Highly Reactive Sulphur or the Reaction of Ammonia and Sulphur Chloride in Rubber Solutions" in *Australian Chem. Inst. J. Proceedings*, Aug., 1937.

[2] Chief chemist, Barnet Glass Rubber Co., Ltd., Melbourne, Australia.

Rubber Aids Tree Life

C. F. Greeves-Carpenter

TREE surgeons have experimented with many substances for filling cavities in trees. Cork, wood strips, bricks, cement, and synthetic wood have been used with varying degrees of success, but the latest material, rubber, is one which seems to answer all requirements.

Rubber Trees Suggest Rubber

George Van Yahres, president of the Van Yahres Tree Service, Inc., Westbury, Long Island, N. Y., late in 1929 made a study of rubber trees in Haiti. Many of them, he noted, had cavities just the same as ornamental shade trees in the United States, cavities which were the result of physical and mechanical injuries or which were due to the ravages of destructive insect pests, fungi, or bacteria. Mr. Van Yahres conceived the idea of preparing such cavities in the same manner as they are prepared in this country, but instead of filling them with any of the standard materials used by tree surgeons, he decided to try using latex as a filling medium. It seemed a reasonable hypothesis that latex would make an ideal filling material as it would be a substance natural to the tree.

Beech Tree Planted by Jefferson at Monticello. This Large Cavity Necessitated Internal Reenforcement

All the diseased wood was cleaned out and the edges of the bark, and thin, tender cambium layer through which the major life processes of the tree are conducted were cut and shaped so that the filling medium would be retained during the callousing over of the area. Next came the task of filling the sterilized cavities with latex. It was then discovered that the latex could not be vulcanized inside the tree cavity without injury to the tree, and necessarily these cavities were filled with cork according to previous practice. Mr. Van Yahres continued his experiments in Long Island, and late in 1930 he conceived the idea of using strips of rubber which would not require later vulcanizing, for the facing of the cavity with a compressible, cementitious material for the area between the facing and sidewalls of the cavity.

Preparation and Application

In August, 1930, a vulcanized soft rubber was used to fill a number of cavities, and the result studied closely from year to year up until the Fall of 1936, at which time the removal of a filling and the laboratory test of the rubber found it in perfect condition after six years' exposure to the elements and direct contact with the wood and the sap of the tree. The cavity walls were in an excellent state of preservation due, no doubt, to the perfect seal formed by a rapid growth of new bark which kept out entirely all moisture and wood-destroying agents.

In the meantime and while experiments were going on, the Van Yahres Tree Service in the field, cooperating with The B. F. Goodrich Co. development engineers in the laboratory, developed a special vulcanized soft rubber compounded so as to be sufficiently stiff to act as a retaining wall for the inside filling without bulging and also be capable of withstanding continuous flexing and long exposure to sunlight and extreme temperature changes. This special rubber is prepared in six-foot strips of varying thicknesses which are cut on the job into lengths slightly greater than the cavity width so as to be compressed into position in the cavity in horizontal layers across its face. The strips have convex top and concave bottom surface so as to fit tightly together. As a result of this socket joint, each block, as it is brought into stacked relation to the adjacent block, may be arculately adjusted either partially or in its entirety to conform the outer face of the resultant filling to the particular curvatures or other irregularities of the tree being treated. This convex and concave idea simplifies the method and permits the operator to accomplish this positioning of each block without impairing the security of

Fitting Over-sized Rubber Strips—Note the Grooving in the Uncut Pieces

the joint. Each strip has a dove-tailed slot on the inner side which enables it to be interlocked with the cementitious plastic filling material.

In the early applications the inside filler consisted of various materials including a mixture of ground vulcanized rubber, sawdust, and wax. Early in 1937, however, Mr. Van Yahres adopted as most suitable the present combination of ground vulcanized rubber and wax which is prepared on the job and heated to diffuse the wax thoroughly. The mix, when fairly cool, is then tamped into the cavity back of each of the rubber blocks as they are built up one upon the other until the cavity is completely closed. Then the outside face of the strips which appear as a solid mass, no joints showing, is roughened by buffing with an electrically operated wire brush and, if desired, may be grooved with special tools to simulate the natural grain of the bark.

Year-old Filling Shows Rapid Closure of Bark

Rubber provides a simple, but advantageous permanent seal against air, moisture, fungi, and insects; permits free flexing of the tree, without abrasive injury to the tender wood cells which would cause loss of sap or retard healing; and adheres to the new growth of bark as it tends to grow over the filling.

Hitherto cavity fillings have been very conspicuous, but with rubber colored to approximate the shade of the bark of various trees, the filled cavities are scarcely noticeable. The outside face of the rubber strips need not be covered with a waterproof paint that is likely to peel and crack with continuous yearly exposure to the elements. An added advantage in the use of rubber is that it can be used irrespective of weather conditions—a feat that is not possible with most of the other filling media on the market. The use of rubber eliminates a great deal of expensive bracing which is found absolutely necessary to retain in the cavity a non-elastic material. The permanency and saving effected by the use of this new method have aroused the interest of thousands of tree owners not only in this country but abroad.

Rubber has an advantage over heavy mediums, particularly when used in the limbs of trees. For instance, when a limb has been weakened by having a large injured area and if a heavy substance is used as the filling medium, it becomes necessary to support the limb by a cable to a strong, healthy branch in order to take up the additional strain imposed by the heavy substance in the already weakened limb. Rubber, owing to its light weight, imposes no such strain. In many instances it weighs no more than the wood of the tree in which it is placed.

This method of filling tree cavities with rubber has proved very successful as the rubber flexes, allowing the tree its full measure of normal bending and twisting, besides acting as an impervious sealing for the wound. Many cavities were filled with it during the early part of 1930 on Long Island estates, and extensive aging tests were made before Mr. Van Yahres definitely decided in October, 1936, to adopt this material for his professional work. When the patented rubber filling was fully developed, the grand old trees planted by Thomas Jefferson at Monticello, Va., were retreated, and all cavities were permanently filled. Thousands of cavities have been filled since the perfection of this new method, and at present a plan is being worked out by the patentees and manufacturers for the licensing of tree surgery concerns throughout the country so that this service may be offered to tree owners for the saving of their trees.

It is interesting to note from records of cases treated that the cost of filling tree cavities with rubber is no more than where other materials are used. In fact tree surgeons estimate lower cost to their clients.

Once again a new use has been found for rubber, and it is one which will do much toward conserving the health and increasing the longevity of our beautiful shade trees.

Rubber De-Icers for Airplanes

DURING the coming winter a great many transport and military airplanes will be equipped with Goodrich de-icers for removing ice from wings and propeller blades. This type of ice removal equipment has been approved by the United States Bureau of Air Commerce.

De-Icer for Wings

The de-icing assembly for wings, not including the mechanical equipment used in its operation, consists of three major parts: (1) an inflatable rubber and fabric tube section; (2) all rubber elastic plies on either side of the tube section; and (3) fabric covered steel reenforcing strips used for attaching the assembly at its outer edges.

The inflatable section is usually composed of three longitudinal tubes of rubber and fabric which are inserted during construction between the plies of rubber. When installed on an airplane, the middle tube is centered along the forward edge of the wing, with the two outer tubes above and below it, respectively. These tubes are inflated by compressed air, the center one being inflated alone and alternately with the two outer ones, which are inflated together. The inflating and deflating of alternate tube groups give a rocking action which cracks the ice and permits the air stream to force it away.

De-Icer for Propellers

The de-icing protection as installed on the propeller utilizes a spinner cap, rubber covered and treated with a special oil preparation. In addition the propellers are covered with rubber on the thrust side. This treatment, while it is not designed to prevent the formation of ice, minimizes adhesion and reduces the tendency of the ice to bridge across over the hub. Thus the centrifugal force of the revolving propeller is permitted to throw off the ice in small quantities without radically disturbing the propeller balance.

Mills and Banbury Mixers

AT A spring meeting of the Rhode Island Rubber Club, Messrs. Davidson and Comes, of the Farrel-Birmingham Co., Ansonia, Conn., debated the particular application of the Banbury mixer together with its advantages over the rubber mill under certain conditions. A number of points, as emphasized in this discussion, are summarized below.

Length of Run

Originally the Banbury was used chiefly for mass production on individual stocks such as tread compounds for the tire industry. There is no doubt that the Banbury is excellent on long runs; however owing to increased knowledge in loading technique and certain mechanical improvements it can be used to practically the same advantage where a large variety of stocks is mixed. It is possible to run one or two batches of one type of stock and then change over to another of a different formula and a varying color. There are a large number of Banburys in use handling 35 to 40 different stocks of many colors within the same eight-hour day. Judgment in rotating the various colors and formulas is advisable, as it is not wise to change from a black master batch to a pure white stock, at least not without a number of cleanout batches. This fact would also be true in mill mixing.

Burned Stocks

It is possible to burn batches in a Banbury as it is also possible to burn them on a mill. At the present time a large number of Banbury users are adding all of the curing materials in the mixer. This has been made possible because: (1) Spray cooling has been added to the mixing chamber sides, and the cooling area per pound of stock has been increased. (2) Larger sheeting mills are being used, thus creating a smaller bank when the batch is dropped on the mill, and the larger cooling area of the rolls will in most cases take out all critical heat in the first pass. (3) The method of installing the Banbury and the sheeting mill has been improved. Formerly, stock was often dumped into some type of box, carried over to the mill, and fed by hand, which allowed the batch to burn in the mass. Mechanical stripping devices and automatic coolers are used with the larger sheeting mills. It has been found, even years ago, that a batch was seldom burned in the Banbury, but often after it had been discharged owing to improper handling.

Where the temperature of the stock is too near the danger point to add the sulphur, as in the case of highly pigmented batches, or where a high percentage of sheet rubber rather than broken down rubber is used, the sulphur may be added on the sheeting mill, after two or three passes have taken out the dangerous heat. The stock is thoroughly mixed and removed from the mill before the next Banbury batch is ready to be discharged. The sheeting mill and the mill operator are available for this work between batches; so nothing is added to the mixing cost.

Dispersion

Although it is possible for a Banbury to mix a bad stock, it is claimed that the average of stocks mixed in the Banbury is better than the average of mill mixed stocks. If the proper procedure of loading is used each time, every batch will be uniform. Mill mixing of stock is dependent on the human factor, and a tired mill man may not mix so well as a fresh one. As the mixing in the Banbury is done in the mass itself, in order to obtain a good dispersion it is necessary to keep the batch as stiff as possible during the dispersion period. Necessary softeners may be added at the end of the mixing cycle.

Rapidity of Banbury mixing as compared with mill mixing is due to the fact that the Banbury works over at least two-thirds of its entire area; while the mill works only in the nip of the rolls. The average mill will have a differential of from 7 to 40 inches, while the Banbury will have a differential between the tip of the rotors and the side walls of approximately 110 inches.

Colors

The Banbury is often used exclusively for mixing colors and rubber, but it should be remembered that, like any other machine, it will produce in proportion to the skill used in operating it. When it is necessary to mix a large variety of colored batches in the same unit, they should be scheduled in the correct order: *i.e.*, first the whites, then the creams, yellows, pinks, etc., then the darker colors, and finally the blacks. After the blacks are completed, rubber should be broken down in the mixer, and the compound handling equipment, the conveyers or chutes, and the mill should be cleaned so as to be ready for the next day's start on white.

Economy of Operation

The Banbury will produce a good dispersion and a uniform stock far more rapidly than a mill, thus effecting a real saving in power and labor. It has been roughly estimated that a Banbury, installed and operated for 20 hours a day for the period of one year, will pay for itself within that time in savings in power and labor alone. In addition, the use of a Banbury usually creates a saving in ingredients and in the method of handling the material both to and from the mixer.

Mills with Aprons and Mill Knives

There is little doubt that a mill with an apron is more efficient than a mill without one and that an apron-equipped 84-inch mill is better than a smaller mill with an apron. The mill knife can be used to advantage where several mills are to be used for the breakdown of crude rubber for one man can operate a number of mills with the aid of this knife. However these advantages do not counteract the savings obtained by the use of a Banbury.

High-Speed Hot Breakdown

The Banbury is not simply a mixing unit, but can be used for warming or breaking down crude rubber just as easily as a mill and with an increase in production. A recent innovation in Banbury operation is running the mixer at double normal speed for high-peed hot breakdown, resulting in the production of very soft rubber in a

relatively short time. Tests have proved that the rubber processed by this so-called "high-speed hot breakdown" method has a smaller percentage of recovery over a given period, that the aging is equal, and the tensile strength of the finished goods is improved.

Recently tests were conducted which illustrate the effectiveness of the Banbury as compared with the rubber mill in the breakdown of crude rubber. Plasticity measurements were made with a Mooney plastometer, and for a basis of comparison crude smoked sheets were assumed to have a plasticity value of 100 on this plastometer.

Sixty pounds of crude rubber were broken down on a 60-inch mill for 15-minute periods, allowing 12-hour rest periods for the rubber to cool between millings. The following plasticity figures were obtained.

Mill Run	Minutes on Mill	Plasticity
1st	15	73
2nd	15	67
3rd	15	62
4th	15	60

Two uninterrupted runs were made on a 60-inch mill using the same opening and batch size as above with the following results:

Length of Run	Plasticity
30 Minutes	70
120 Minutes	64

The following figures were obtained on a standard No. 11 Banbury, using 300 pounds of smoked sheet in each case.

Cooling Water On	Rotor Speed	Minutes Run	Final Temp.	Plasticity
Yes	Normal	15	270° F.	75
No	Normal	15	365° F.	67
No	Double	11	425° F.	40

On a No. 3A Banbury, operating at double rotor speed and with cooling water turned off, the following results were obtained. In each case 85 pounds of smoked sheet were used.

Minutes in Mixer	Final Temp.	Plasticity
2	340° F.	69
3	380° F.	67
6	415° F.	44
8	425° F.	35

It is noted that the No. 3A Banbury operating at double rotor speed and with cooling water off produces a rubber having a lower plasticity in less time than the No. 11 Banbury operating under the same conditions. Inasmuch as the two machines are designed to perform equivalent breakdown on the amounts of rubber used, the discrepancy in the results obtained was probably due to the use of different batches of smoked sheets.

Comparing the figures in the above tables, it is obvious that the most efficient and quickest method for breaking down crude rubber is by hot breakdown on a Banbury operating at high speed.

Reaction of Ammonia

(*Continued from page* 46)

itate. The product of NH_3 and S_2Cl_2 in benzine contained some active accelerating and vulcanizing component due apparently to the N_4S_4 contents, but when added to the rubber solution, prolonged heating only produced a vulcanizate containing 2.5% sulphur, which compares with over 30% combined S from the same proportions of these reactants when the rubber was present during precipitation.

The precipitate is not formed directly as a result of the direct action of S_2Cl_2 on the rubber, this being shown by the small percentage of chlorine in the precipitate, and by the fact of the precipitate being formed in solutions of alkaline condition.

Effect of the Reaction on Oils

Samples of brown Factice or oil substitute can be produced which ordinarily require high temperatures for long periods on a mixture of oil and sulphur. Thus, on adding 7 ml. of S_2Cl_2 to 45 ml. of linseed oil and 40 ml. of benzine and then passing NH_3 through, the charge changed rapidly at a certain point, and with evolution of much heat, into a rather soft brown Factice, the final stage of the reaction to a hard condition being prevented by the inability to continue the introduction of the ammonia.

Summary

When sulphur chloride and ammonia gas react in the presence of rubber in a benzine solution, a precipitate is formed which contains, in addition to NH_4Cl, sulphur, etc., sulphur combined with the rubber in varying proportions according to the amount of S_2Cl_2 used and thus the amount of this active form of sulphur produced. A limit is reached, however, beyond which no additional rubber sulphur product is obtained.

All degrees of vulcanizates containing corresponding amounts of sulphur were obtained.

Apparently the sulphur of the reaction combines with the rubber in a rapid manner, by reason of its production in a highly active state. Unless contact with the rubber takes place at its formation, the sulphur polymerizes and no combination results.

The results are of general interest from the standpoint of chemical reaction of physico-chemical effects. They are of importance in regard to the problems of vulcanization and the production of vulcanizates and provide another avenue of investigation for the solution of the various problems relative to these phenomena.

Softening Agents

(*Continued from page* 45)

service conditions should be considered.

It is apparent that in compounds designed for oil resistance the use of the following softeners should be *avoided:*

Palm oil
Paraflux
Oleic acid
Rubberine Gel
Stearic acid

If the best water resistance is to be obtained with a magnesia-zinc oxide stock, the use of the following should be *avoided:*

Beta shellac
Cotton seed oil
Glue
Palm oil
Rubberine Gel

These data indicate there are several softeners which may be used in stocks that must have good gasoline resistance and meet the Underwriters' specifications. Some of these softeners are satisfactory because they are insoluble in gasoline, and others because, even though soluble, they are volatile in the distillation range of gasoline. Possible softeners for gasoline hose stocks are:

Bardol B
Barrett No. 10
Bornyl chloride
Dipentene
Diphenyl
Iso borneol
Iso borneol acetate
Lorol chloride
Mentor 30
Pine oil

New-Type Cotton Tire Cord

Minimized Heat Generation and Decreased Growth Produce Increased Tire Life

THE problem of destructive internal tire heat has always been a troublesome one for tire engineers, tire designers, and rubber chemists. This problem has become more acute since the advent of automobiles and trucks designed to carry heavier loads at higher speeds and the construction of highways that will permit runs at these higher speeds.

When a tire rolls against the road, the tread, cushion breaker, and plies are continually flexed. As the stresses are not uniform throughout the casing, friction is produced within it; this friction is especially severe between the cord plies at the shoulder flexing zones.

This problem of internal tire heat has been approached from several angles. Rubber compounds of high conductivity have been developed to provide a means of heat removal before it can seriously damage tires; rayon fabric is being used to resist the heat which is developed; and finally, in an effort to mitigate the difficulty at its source a tire fabric made of low stretch, high twist, low gage cotton cord has been developed.

Tire Growth Promotes Heating

In the latter case the problem was approached from the viewpoint that less heat should be generated within the tire, and in order to accomplish this it was apparent that certain fundamental changes in the tire fabric must be made.

It is known that a tire, when subjected to the ordinary stresses and strains while in service, gradually enlarges to a certain maximum point owing to the stretch of the cords. Upon dissecting a tire that has thus been enlarged and testing its cords, it will be found that the cords in all of the carcass plies have suffered a loss of elongation, while the tensile strength of the cords is not appreciably altered. If the tire is continued in service over an extended period beyond the time when it has enlarged to its maximum degree and to the point where it is approaching the end of its useful life, the cords in the inner carcass plies will show a further loss of elongation and a decided decrease in tensile strength, while other plies in the same tire may remain unchanged. This condition indicates that as the tire enlarges or "grows," the stresses and strains within the carcass become unequal, and with these varying stresses, heat generation is greatly increased.

In addition tests have shown that a large proportion of the total heat is generated within the cords themselves. It was reasoned, therefore, that if the stretch capacity in the cords of each ply of a tire were reduced, there would be less tire growth during service and, consequently, the strains would remain equal for the life of the tire. Also, since heat is generated within the cords, a smaller cord would produce less heat while bending or flexing. In making the cord more compact and smaller it is essential to retain the necessary flexibility and strength.

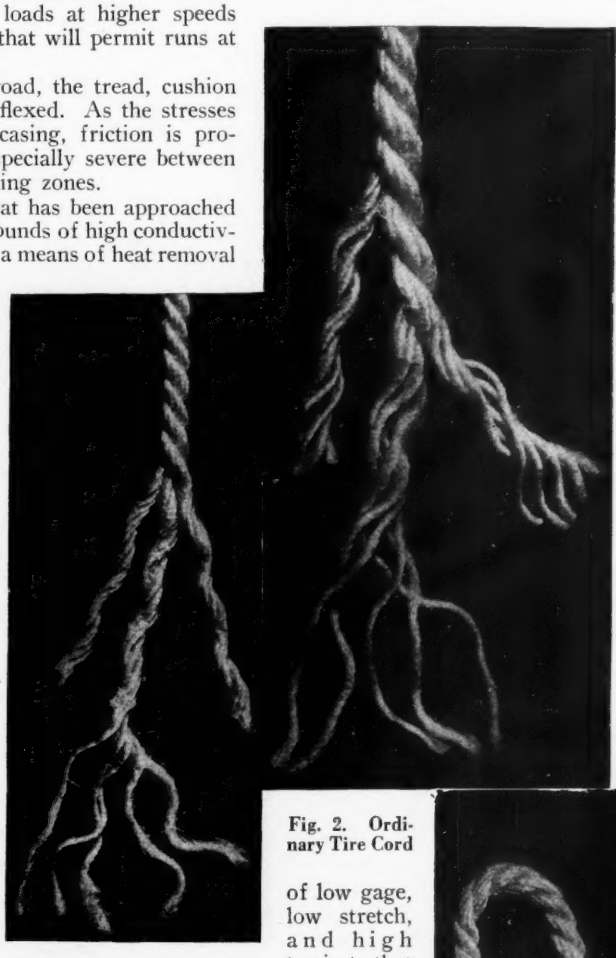


Fig. 1. Low Stretch Cord

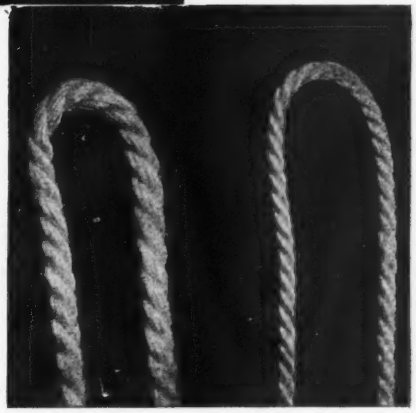


Fig. 2. Ordinary Tire Cord

Cord Construction

A tire construction with cotton cord of low gage, low stretch, and high twist that had the above-mentioned desirable characteristics was finally developed by A. H. Nellen, who has assigned his patent[1] rights to the Lee Tire & Rubber Co., Conshohocken,

Fig. 3. Ordinary Cord—Low Stretch Cord Strand Position When Curved

[1] U. S. patent No. 2,028,003, Jan. 14, 1936; Reissue No. 20,316, Mar. 21, 1937. Canadian patent No. 368,136, Aug., 1937.

Pa. This cord is produced by twisting the yarn into the desired cord structure either by the "wet twisting" process or by other suitable methods. In reference to a cord of 23/5/3 construction, when the cord is twisted by this process with a twist of not less than 19.0-9.0, it has lower stretch characteristics and higher tensile strength than that of the standard 23/5/3 cord with the conventional 18-8 twist. The first twist numeral refers to number of turns per inch in the forming twist of the 23/5 strand, while the second refers to the turns in the final twist of the 23/5/3 cord. A cord of this new type is shown in Figure 1; while Figure 2 illustrates a conventional cotton cord of the type generally used by tire manufacturers. Both cords are of the same construction in reference to the number of yarns in a strand and the number of strands in the finished cord.

In comparing these two cords it will be noted that the individual yarns of the ordinary cord (Figure 2) are fluffier and less compact than those of the new-type cord (Figure 1). Also the five-ply twist of the ordinary cord is much looser and less compact than that of the new-type low stretch cord, and finally, the finished ordinary cord is less tightly twisted than the new-type cord. As the illustrations show, there are more twists in the new cord than there are in the ordinary cord.

Tests have shown that this tight, compact construction results in lower stretch, equal or greater tensile strength per cord, and much greater tensile strength per unit weight of cotton.

Figure 3 shows ordinary and low stretch cords magnified four times and curved so as to show the effect of flexing on the two types of cord. On the inside of the loop the individual yarns of the ordinary cord are seen to be puckering to some extent, while on the new-type cord there is no obvious deformation of the yarns. Further, in the ordinary cord there are only five spirals or twists in the flexed portion of the cord, but in the low stretch cord there are eight spirals in the flexed portion.

Effect on Tire Performance

The damage done to cords by tire flexing takes place on the inside or compression side because of this puckering effect, which tends to separate and gradually saw off the individual yarns from the main cord structure. By tightly twisting the compact yarn, and thereby decreasing the size of the cord, this movement of the yarns on the compression side of the cord has been considerably reduced. This construction also results in a decrease of heat generation which is caused by friction between loose fibers or strands on the inside of the curved section.

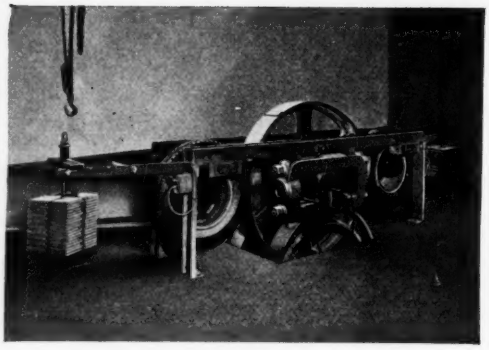


Fig. 4. Test Wheel—Bureau of Standards Type

TABLE 1

Comparisons
Endurance Test Run at 50 M.P.H.

	Endurance Test Index	% Overload at Failure	Avg. Cord Tensile in Lbs.
6.00-16 4-Ply Tires			
Load on tire was increased by 174 pounds each 500 miles to tire failure			
Patented Low Stretch Cord Tires	153.3	143.3	17.2
Tire No. 4	129.0	122.4	14.3
No. 3	115.6	102.6	14.0
No. 2	102.8	102.6	14.6
No. 5	98.2	80.7	15.0
No. 1	67.4	60.0	14.1
6.00-16 6-Ply Tires			
Load on tire was increased by 175 pounds each 500 miles to tire failure			
Patented Low Stretch Cord Tires	139.6	143.3	13.5
Tire No. 3	104.6	122.4	10.8
No. 2	99.1	80.7	13.5
No. 1	93.9	80.7	11.9
No. 4	92.1	60.0	11.0
6.00-20 Truck Tires			
Load on tire was increased by 174 pounds each 500 miles to tire failure			
Patented Low Stretch Cord Tires	135.7	94.0	16.8
Tire No. 3	115	80.0	13.4
No. 4	107.8	80.0	14.8
No. 2	98.3	70.0	16.6
No. 1	98.2	70.0	14.6
No. 5	84.7	58.0	15.8

TABLE 2

	Section Growth	O. D.* Growth	Total
Patented Low Stretch Cord Tires	.9%	.5%	1.4%
Tire No. 1 (first line)	2.8%	1.5%	4.3%
Tire No. 1 (second line)	2.2%	1.5%	3.7%
Tire No. 3 (first line)	3.3%	1.7%	5.0%

*Outside Diameter.

In addition, the plies of a tire carcass constructed of this new-type cord are all of approximately the same tensile strength throughout the useful life of the tire and the elongation of the cords is approximately of the same low value in all the plies. Consequently, tires of this construction are not so readily subject to failure as tires having certain plies, particularly the inner plies, that deteriorate more rapidly than the others. The cause of failure in the latter case is largely attributable to pronounced differences in tensile strength and elongation loss of the cords in different plies.

Because the new-type cords are smaller, the placing of more rubber between each ply and between each cord of the tire is made possible without increasing the carcass thickness. This further reduces the internal friction in the carcass, improves adhesion, and reduces separation troubles. By a mechanical frictioning process, 53 pounds of rubber per 100 pounds of cord are forced into and between the low stretch cords in addition to the skimcoats of rubber which are put on both sides of each ply.

Comparative Endurance Tests

In order to conduct comparative tests which would be indicative of tire performance, five tires, of different makes and representative of high quality American tires, were purchased from fresh stock. For identification purposes these tires were numbered one to five inclusive. It should be remembered, however, that the composition and construction of all makes of tires are constantly undergoing development and change so that while each test included is representative of the comparative merits of each tire tested and is a guide for judging its qualities, it should not be assumed that any test or series of tests will positively predict the ultimate service that any make of tire will produce under all operating conditions.

As it is obviously impossible to operate six tires in a road test under precisely the same conditions, laboratory equipment was used in conducting the endurance tests. The machine used for this purpose is usually referred to as the Bureau of Standards type test wheel and is shown in Figure 4. The tires to be tested are mounted on wheels held rigid at the axis at one end of a cradle and ride against the test wheel at any desired speed and at load pressures regulated by the weights on the opposite end of the cradles. Load pressure on the tire, air pressure in the tire, and speed at which the load is carried are therefore under accurate control. Charts showing mileage, temperatures, etc., from beginning of test until failures occur can be accurately compiled. The results of the endurance tests

on the new-type low stretch cord tire and the five tires selected for comparative purposes are shown in Table 1 on the preceding page.

THE "ENDURANCE TEST INDEX" used in Table 1 is calculated by taking the average mileage of all the tires in each test and then dividing the actual mileage of each tire by this average. This figure gives at a glance the comparative flexing resistance of the various makes expressed as percentage over or under the average.

PER CENT OVERLOAD AT FAILURE: When the test started, the load pressure on the tire, that is the weight on the cradle, equaled the normal load which the tire was built to carry according to specifications prepared by The Tire & Rim Association, Inc., the industry authority. After running 500 miles the load pressure on the tire was increased by adding weight on the cradle, and this increase was repeated each 500 miles until the tire failed. Adding weight (increasing the load) increases the flexing area in the tire and consequently causes the generation of higher and destructive internal temperatures.

AVERAGE CORD TENSILE: Cords taken from all plies after failure were tested for tensile strength on a Scott tester with spool-type jaws. The average tensile strength per cord is recorded.

Rayon Tires

In order to compare tires made from new-type low stretch cotton cord and rayon tires several of the latter were obtained in the 32 by 6 10-ply size and tested for endurance against tires of the same size, made from the patented cord. The rayon tire ran 22% less mileage than the new-type cotton tire before failure and failed with 40% overload, and the new-type cotton cord tire did not fail until it was overloaded by 55.6%.

Other Tests

The compactness and the rigidity of this new-type cord make tires constructed of this material less liable to squash down and flatten out under sharp impacts, and as a result, comparative drop tests made on the guillotine show that these tires have less tendency to bruise than tires made with ordinary cord.

Laboratory tests conducted at temperatures up to 300° F. show that ordinary cord deteriorates more in tensile strength and elongation after prolonged heating than the patented cord.

A test on a 1937 Ford test car using 6.00-16 4-ply tires shows the comparison in growth between a new-type low stretch cord tire and three other tires of different make after running 17,900 miles during the hot summer months. During this test the tires would run the same mileage in each wheel position. The data on growth are shown in Table 2.

Permeability

(*Continued from page* 41)

cloth, a square-woven cotton fabric having a thread count of 120 in both directions, the average weight of a square yard being 2.05 ounces.

The results indicate the same relative difference in the permeabilities of the two derivatives as was obtained in the examination of the unsupported films.

The effect of the supporting fabric upon the permeability is apparent when comparison is made with the values obtained for unsupported films given in Table 1.

Permeability to Helium

Since helium is employed in lighter-than-air craft in this country as the lifting gas, it is of interest to note the relation between hydrogen and helium permeabilities of a polysulphide resin. A few measurements made on fabrics coated with different weights of coatings on fabric are given in Table 2.

TABLE 2. PERMEABILITIES OF TETRASULPHIDE DERIVATIVE TO HYDROGEN AND HELIUM

	Permeability ($Ft.^3/Yd.^2/24$ Hr.)		
	Helium	Hydrogen	Ratio Helium to Hydrogen
	0.006	0.009	0.66
	.011	.017	.64
	.014	.023	.60
	.009	.013	.66
Average ratio	....	....	0.64

Mechanism of Permeation

It is possible that the passage of a gas through a material may be simply filtration through intermolecular spacings or, in highly permeable substances, an actual porosity, or it may take place by a process of adsorption of the gas on the surface, followed by diffusion through the material. Under practical conditions, particularly with the heterogeneous compositions widely employed, both mechanisms may function. The behavior of the organic polysulphide resins may perhaps be explainable with either. In these resins the sulphur atoms are enormously large compared to the other constituents of the molecule. They are in effect linear polymers of sulphur atoms. From the viewpoint of simple mechanical phenomena the intermolecular spacings of substances containing such large amounts of sulphur must be small and a high degree of impedance might be anticipated. The lower permeability of the derivative containing the greater amount of sulphur might be attributed to a greater structural density in this substance. On the other hand these materials would be expected to be inert compared to a material such as rubber and hence would offer much less solvent action toward hydrogen.

The information reported herein was obtained in the course of an investigation conducted for the Bureau of Aeronautics, United States Navy Department. The interest of this organization and particularly that of Commander Garland Fulton is gratefully acknowledged.

Tire Balance

The balancing of tires has become important because of increased driving speeds and more sensitive steering mechanisms. Dots placed on the sides of automobile tires indicate tire balance and at what point the inner tube valve should be placed with respect to the casing. Balanced tires as original equipment are sent to automobile manufacturers with tubes in place in the casings and partly inflated. When used on balanced wheels, these tires provide an almost perfectly running wheel assembly. Tires sold directly to automobile owners are marked with a dot to indicate the highest point, the position for the valve stem. It is predicted for the future that service stations and garages will be equipped with wheel balancing machines which will provide a convenient means for motorists to have their tires re-balanced as the occasion demands.

Editorials

Interrupted Recovery

UNPRECEDENTED in the history of recoveries from general depressions, the present set-back is the sixth in the five-year-old forward march. It is in a large measure due to the purchaser's inability to pay the increased prices resulting from a lack of balance between the unit cost of production and the individual weekly income of workers in both the daily and salaried classes and also is due to accumulated lack of confidence that the upward trend will continue uninterrupted, which fact is caused by unhealthy forcing of the growth of business without a sound economic basis.

In the case of daily wage earners in general the hourly rate has been materially increased, but owing to the decreased number of weekly hours per employe the unit labor cost has increased without a proportionate addition to the per week income. The income of salaried employes has not been advanced to cope with the rising cost of production and consequent selling price. Therefore all are faced with the fact that their weekly compensation will not buy so many units as previously, which means that the individual's procurements must be reduced and thus discontent as well as a feeling of insecurity results. During the past several years the reserves of employing companies have been depleted or reduced to narrow margins, and as a result there is not available a surplus which can be disbursed so as to compensate for the decreased buying power of the individual income.

There is no easy road to plenty, and in order to receive more the nation as a whole must produce more wealth with a cash value. Redistribution does not produce wealth and cannot compensate for decreased purchasing power. If a sustaining recovery is to be enjoyed, it must be based on sound principles, and government, labor, and industry must realize unitedly their interdependence with a sincere will to work out of this period of stagnation rather than to hope for a free ride. There is no substitute for cooperative and intelligent application of hard work if success in any undertaking is to be attained.

Before stability and confidence can be established there must be definite evidence of a governmental intention to discourage strife and to work jointly with labor and management in planning a workable course of action which will give due consideration to the interdependence of all parties concerned with industrial success. If the functions of each are fully recognized and a unanimous consideration is given to their necessary livelihood, the present recession will be of short duration, and the continuation of recovery will proceed so long as that spirit of cooperation exists. Instigated class selfishness must be replaced by a determination to work unitedly with due regard for the rights of all citizens.

Synthetic Rubber?

SYNTHETIC RUBBER is a term more or less generally applied to materials of rubber-like properties.

Attempts to provide a suitable limiting definition for the classification of such materials have resulted in widely varying opinions as to the proper grouping of closely allied products. Some authorities base their definition of *Synthetic Rubber* on chemical composition, and others on varying minimums of elasticity with practically no permanent-set.

Probably the most desirable basis of consideration has to do with the physical characteristics of the material and the possibility of its similar manipulation and usage rather than its chemical composition. If this is admitted, then the designation *Synthetic Rubber* is a misnomer.

"Webster's International Dictionary" defines, as applied to chemistry, the adjective *Synthetic* as "Of, pertaining to or formed by artificial synthesis; as synthetic camphor" and defines *Synthesis* as "The art or process of making or building up a compound by the union of simpler compounds or of its elements; as the synthesis of water from hydrogen and oxygen—contrasted with analysis." Interpretation of these definitions indicates a product of chemically constituted identity. Webster defines *Artificial* as "Made or contrived by art; produced or modified by human skill and labor, in opposition to natural" and also defines *Artificial Rubber* as "an imitation of rubber, as one prepared by treating certain oils (linseed, cottonseed, etc.) with sulphur chloride." This definition implies a product of similar characteristics, but not necessarily of the same chemical composition.

In the past many materials have been named without due regard to eventual inconsistencies and through perpetuated usage those names have been so unanimously adopted that correction to a more significant terminology became impractical. Inasmuch as the development and application of artificial rubber-like materials are in their comparatively early stages and as non-uniformity of definition now exists, steps should be taken to further the adoption of a class-name and limiting characteristics that in the future will prevent confusion and injustice.

The terminology used for this group of materials is of definite importance for future identification and discussion.

EDITOR

What the Rubber Chemists Are Doing

A. C. S. Rubber Division Activities

Chicago Group

THE Chicago Group, Rubber Division, A. C. S., held a meeting on October 29 at the Sherman Hotel, Chicago, Ill. L. J. D. Healy, program chairman for the evening, presented H. B. Townsend, of the Vultex Chemical Co., who spoke on "The Application of Vulcanized Rubber Latex in Industry." After reviewing the development of vulcanized latex since its inception in 1914 by Dr. Schidrowitz, Mr. Townsend described the application of vulcanized latex (Vultex) to dipping, coating, and spraying processes and pointed out that the use of this material eliminates the necessity of vulcanization after forming the rubber article. In discussing the tendency of latex compounds to run down and form sags and unequal deposits during dipping processes, Mr. Townsend disclosed that through a development now nearing completion, this disadvantage will be completely avoided.

The second speaker was Bob Elson, sports commentator of radio station WGN, whose subject was "Broadcasting Sports."

The Christmas meeting to be held on December 17 at the Hotel Sherman will be in the form of a Ladies' Night. The program committee has arranged several unique features for this affair, and reservations are now being received by the secretary, B. W. Lewis, Wishnick-Tumpeer, Inc., 435 N. Michigan Ave., Chicago, Ill.

Los Angeles Group

THE Los Angeles Group, Rubber Division, A.C.S., held its November meeting at the Hotel Mayfair with an attendance of 82. Introductions were made of 19 new members, a record for one meeting. Nominations for 1938 officers, to be elected at the December meeting, were announced by the committee headed by W. B. Reeder, of Samson Tire & Rubber Co.

F. T. Woellner, professor at U. C. L. A., gave a humorous and instructive talk on "How to Use Your Mind." He stated that with sufficient sleep, a satisfactory diet, and interest in one's work, it would be impossible to overwork or have a nervous breakdown. He termed such a breakdown as "getting out of gear" and suggested that a reasonable amount of humor be injected, as a lubricant, into all situations enabling the gears to turn more smoothly. This was followed by an interesting movie, presented by M. Jones, of the Southern California Gas & Electric Co., covering the history of natural gas and its production, transportation, measurement, and uses.

L. O. Smith, of the National Standard Co., donated as the door prize a floor lamp, which was won by W. Wood, of the Darnell Corp. The raffle prize, a combination floor ash tray and umbrella rack, contributed by T. Kirk Hill was won by J. E. Tufft, of the *Rubber Age*. Dinner favors were miniature tire ash trays contributed by Goodyear Tire & Rubber Co. A large banner with the full name of the group and the A. C. S. insignia was presented by Garvin Drew, through the courtesy of A. Schrader's Son.

Boston Group

THE Boston Group, Rubber Division, A. C. S., held its fall meeting on November 19 at the Hotel Kenmore, Boston, Mass., with 125 in attendance. Officers were elected for the coming year as follows: chairman, G. W. Smith, The Barrett Co.; vice chairman, E. H. Krismann, E. I. du Pont de Nemours & Co., Inc.; secretary- treasurer, A. R. Lukens, Thompson-Weinman Co.; executive committee, Gladding Price, R. T. Vanderbilt Co.; J. C. Walton, Boston Woven Hose & Rubber Co.; and R. J. Noble, retiring chairman of the group.

Ira Williams, E. I. du Pont de Nemours Co., Inc., Wilmington, Del., spoke on "Peptizing and Gelling Effect in Rubber." His presentation consisted of an informal review of the subject, emphasizing the more important theoretical concepts involved. In discussing the ability of rubber to be transformed alternately into the gel and sol phase, Mr. Williams pointed out that while the colloidal state is apparently reversible, each successive change is accompanied by a loss in energy. Thus, untreated crude rubber is at the maximum energy level, and upon alternate peptizing and gelling a rubber at a lower energy level is produced at each stage. This repeated reversing is made possible by successive chemical changes that occur in the rubber and that are produced by the action of the peptizing or gelling agents used. Mr. Williams illustrated the theoretical points involved by mentioning the effect of several specific materials on solutions of rubber in organic solvents. He also brought out the fact that the energy level of synthetic rubber was considerably below that of natural rubber.

E. L. Foss, of General Motors Co., in a presentation of "Previews of Progress" stressed the need, particularly at the present time, of intensive scientific research that will lead to the development of new products which in turn will form the ground work for new industries. Several new scientific developments including Polaroid and a highly magnetic alloy having a far-reaching effect in their field of application were demonstrated. In conclusion a motion picture depicted some of the interesting processes whereby new products are born and create industries.

A. Lukens showed movie shots taken at the Boston Group outing last summer. This provided some of the golfers with an opportunity for checking up on their technique.

Akron Group

THE first winter meeting of the Akron Group, Rubber Division, A. C. S., will be held December 3 at the Akron City Club, Akron, O. The speaker will be Frederick O. Anderegg, Ph.D.; his subject, "Fiberglass Textiles." In addition to a general description of the process and material illustrated with lantern slides, he will talk on the strength of glass fibers as related to rubber resins and similar materials.

Detroit Group

THE Detroit Group, Rubber Division, A.C.S., will hold its Christmas meeting at the University Club, Detroit, Mich., on December 8. A. H. Brown, of the research laboratories of the Detroit Edison Co., will address the group on "Vibration and Springs." The recently formed Detroit Group extends a cordial invitation to members of other rubber groups to be present at this meeting.

New York Group

THE election of officers for 1938 will take place at the Christmas dinner party of the New York Group, Rubber division, A.C.S., to be held Friday, De-

cember 17, in the clubrooms of the Building Trades Employers Association, 2 Park Ave., New York, N. Y.

The program following the dinner will include a talk on "Recent Experiences at the Plantations" by Prosper E. Cholet, of H. Muehlstein & Co., Inc., 122 E. 42nd St., New York. During the evening entertainment and gifts will be provided.

Tickets for the dinner and entertainment will be $2.50 for members and $3.50 for non-members. Reservations may be made by addressing B. Brittain Wilson, secretary-treasurer, in care of INDIA RUBBER WORLD, 420 Lexington Ave., New York, N. Y.

Rubber Division Spring Meeting

THE Rubber Division of the American Chemical Society, by decision of its executive committee will hold its spring meeting at the Book Cadillac Hotel, Detroit, Mich., March 28 and 29, 1938. It is suggested that those planning to attend the meeting make reservations as soon as possible after January 1.

The deadline for receiving papers for the meeting's program is February 21, 1938. Papers should be forwarded—four copies of each paper submitted for presentation at the meeting, together with an abstract of the paper of 200 words or less—to the chairman of the papers committee, G. K. Hinshaw, Goodyear Tire & Rubber Co., Akron, O., by February 21.

London Rubber Conference Papers

THE Rubber Technology Conference to be held in London, England, under the auspices of the Institution of the Rubber Industry, will take place the week of May 23, 1938. Members of the American Chemical Society have been invited to attend and participate in the program. The committee on arrangements for this conference consists of Dr. A. A. Somerville, chairman, W. B. Wiegand, and J. M. Bierer. All those interested in the London conference with a view of possibly attending it are requested to communicate with C. W. Christensen, secretary-treasurer, Rubber Division, A.C.S., in care of Monsanto Chemical Co., 1012 Second National Bldg., Akron, O.

Those who wish to present papers should forward the original and three copies, together with an abstract of not more than 200 words to A. R. Kemp, Bell Telephone Laboratories, Inc., 463 West St., New York, N. Y., not later than March 1, 1938. Mr. Kemp will forward all of the American papers in one lot to the London committee.

National Research Council

The Committee on Electrical Insulation, National Research Council, held its tenth annual meeting and conference in New York, N. Y., on November 4 and 5. Among the papers presented two were on rubber: "Rubber as a Dielectric" by A. R. Kemp, Bell Telephone Laboratories; and "The Effect of Fillers on the Electrical Properties of Rubber-Sulphur Compounds" by A. H. Scott, National Bureau of Standards.

Low-Cost Thermoplastic Resin

PARADENE, a new coal-tar product which is compatible with rubber and rubber derivatives, is a dark brittle resin having a conchoidal fracture and high natural gloss. Said to possess a high degree of wetting power, the molten resin has been found to disperse pigments and fillers rapidly. Paradene, manufactured by The Neville Co., Pittsburgh, Pa., is available in three grades of different melting point: No. 1, 75-99° C.; No. 2, 100-124° C.; and No. 3, 125-140° C.

The following is a brief summary of its physical properties not mentioned above: brown to black in color; soluble in aromatic solvents; softens upon heating, becoming plastic below its melting point and fluid above it; stable to heat up to 190-200° C.; chemically neutral and inert; and resists water, alkalis, and dilute acids.

Experimental work indicates that Paradene will be useful, largely as a softener and inert filler, in compounds for hard rubber products, mechanical rubber goods, and rubber floor tile. In addition it may prove useful as an anti-scorch material.

R. I. Club Meets December 3

THE Rhode Island Rubber Club will hold its next meeting on Friday evening, December 3, at the Narragansett Hotel, Providence, R. I. William F. Tuley, of Naugatuck Chemical, will speak on "New Developments in Accelerators and Acceleration." The non-technical part of the program will be a talk on "Football Builds Men" by "Tuss" McLaughry, head coach of the Brown University football team. A bowling tournament will precede the meeting.

New Standards Approved by A.S.T.M.

The American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa., has approved for publication a number of new tentative standards. Among these are Tentative Specifications for Rubber Gloves (D 120-37T) and Insulated Wire and Cable: Heat-Resisting Rubber Compound (D 469-37T), and Tentative Methods of Test for Rubber Hose (D 380-37T), Rubber Insulated Wire and Cable (D 470-37T), and Changes in Properties of Rubber and Rubber-like Materials in Liquids (D 471-37T).

Canadian Rubber Meeting

THE first joint meeting of the Rubber Sections of the Hamilton and Toronto Chemical Associations for the 1937-38 season was held at Hamilton, Ont., October 22 with 98 in attendance. The speaker was F. H. Banbury, whose subject was "Some Remarks on Banbury Mixers and Their Present Uses." The talk, which was interesting and instructive, was followed by a lively discussion.

Officers for the year are as follows: chairman, G. R. Smye, Firestone Tire & Rubber Co., Hamilton; treasurer, A. Briant, G. L. Griffiths & Sons, Ltd., Stratford, Ont.; secretary, C. L. Brittain, Gutta Percha & Rubber, Ltd., Toronto, Ont.; Program Committee, chairman, secretary, and L. D. Carver, Dunlop Tire & Rubber Goods Co., Toronto; and O. B. Crowell, Viceroy Mfg. Co., Toronto, Ont.

Neoprene Cements

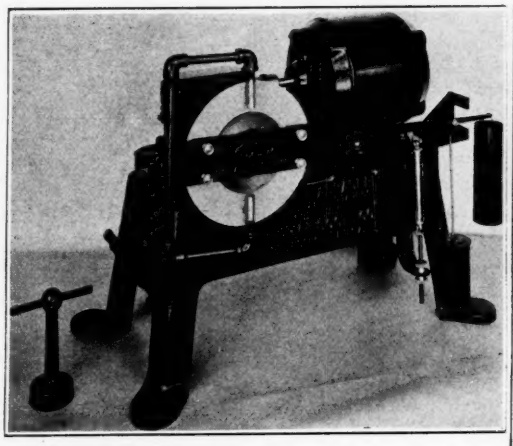
NEOPRENE cements, unvulcanized Neoprene compounds dispersed in a solvent, have been recently developed by E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., for use as adhesives, oil resistant impregnating agents, and protective coatings. Three different grades of cement are available. Type 1, consisting of Neoprene, solvent, and activating ingredients for curing, is primarily used as a binder or adhesive where maximum strength is needed. Type 2 contains, in addition to the materials used in the aforementioned type, some carbon black and inert fillers. This cement forms a protective film which withstands flexing. Type 3, a highly loaded Neoprene cement of lower cost, is recommended for use where flexing qualities of the film are not important.

Neoprene cements can be thinned with benzol, toluol, xylol, carbon tetrachloride, or solvent naphtha which is the solvent used in formulation. Vulcanization is effected in three hours at 260° F. or at a lower temperature for a longer period of time. Self-curing will take place at ordinary temperatures in three weeks to one month.

Flameproofing Chemical

Ignex, a new material for flameproofing, is available as a clear, non-poisonous liquid which dries to a tenacious, transparent, and somewhat flexible film. Originally developed for flameproofing curtains, drapes, upholstery, etc., Ignex is now being used as a coating film for rubber products. Its use, however, is limited to products that will encounter only a moderate amount of flexing in service. Ignex is also used for impregnating sponge rubber to render it flameproof. Application is accomplished through either dipping or spraying. As Ignex is water soluble, washing will remove it, making a new application necessary.

New Machines and Appliances



Abrader with Dash Pot

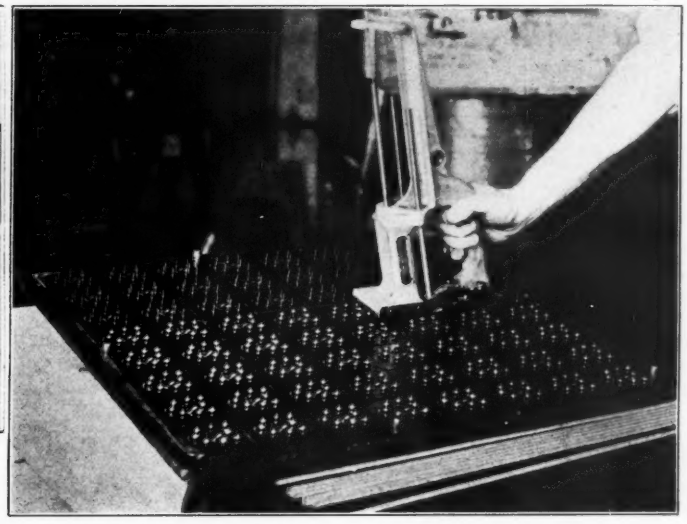
Oil Dash Pot for Abrader

A RECENT development provides a means of dampening vibration in the conventional du Pont abrader. An oil dash pot, shown at the lower right in the illustration and attached to a leg of the machine, is connected to the lever arm between the spring balance and the balance weight. This attachment, which requires SAE 30 machine oil, effectively reduces vibration in the lever arm. The dash pot is now standard equipment on du Pont abraders or can be readily attached to the previous model. Henry L. Scott Co., Providence, R. I.

Rubber Heel Machine

IN THE manufacture of rubber heels, washers are placed over the mold pins automatically by means of a glider washer setting machine. The washers are stacked on wires in the machine which is drawn over the pin plate of the molds. During this operation a washer is placed over each heel pin. In order to use the glider, it is necessary that the pin plate be separate from the cavity plate, and the pins in the molds should be in alinement and of even height. The dowel pins, on the outer edge, which assure proper positioning of the cavity plate in relation to the pin plate, preferably should be in the cavity plate. Thus the dowel pins will not interfere with drawing of the glider over the pins.

Two standard-size machines are available for eight-nail or less heels. A larger machine will accommodate 13-nail heels. Owing to the need of accuracy, the glider is accommodated to the particular pins, washers, and the range of heels to be used.

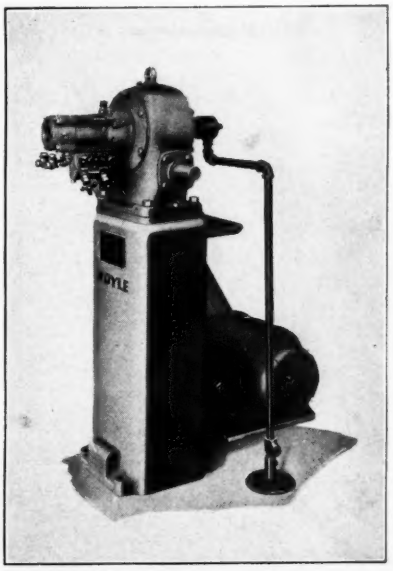


Washer Setting Machine

Another machine is available for stringing washers from bulk. A cylindrical disk picks up the washers in a hopper and transfers them to the stringing wires. J. W. Moore Machinery Corp.

Light Duty Extruder

FOR efficient production of small tubular and solid forms, insulating fine wire, and for laboratory experimental work, the Royle No. ½ extruding machine has been completely redesigned to meet an ever-increasing demand in the rubber and plastics industries. The running of small amounts of stock on a large machine often necessitates wasteful "bleeding" or results in useless churning of stock and wear on running parts, vulcanization of stock before the mass extrudes through a limited die area, or undue expansion of the stock after it leaves the die. This machine with a cylinder diameter of 1⅛ inches is designed to avoid the above disadvantages of the larger machines and is particularly adaptable to laboratory work.



Royle Perfected No. ½ Extruder with Standard Tubing Head

This rugged extruder embodying the features of the heavier machines is 39 inches from floor to feed throat, occupies floor space 32 by 25 inches, and weighs approximately 350 pounds without the 2 h.p. motor usually used. The extruder is ordinarily supplied with motor base, belts, and sheaves, but without the motor.

Head

Steam and water passages surround the die opening in the forward part of the cylinder for temperature control. The machine is equipped either with standard tubing head or a head suitable for internal soapstone application for thin-wall work.

Stock Screw and Cylinder

The cylinder has a renewable liner or bushing and jackets for steam and water circulation. Patented features of the feed throat promote rapid, continuous automatic feeding. The Royle stock screw is milled from forged steel. In standard screw design the flutes are milled with accurate progressively

diminishing pitch. Internal water cooling is usual.

Bearings and Lubrication

Stock screw shoulder bearing is of hard bronze. Worm gear shaft ends run in sealed ball bearing units; while stock screw thrust bearing is of roller type. All working parts of the enclosed gear and thrust section are continuously bathed with oil by means of an automatic splash-and-gravity system. Stock screw shoulder bearing has a compression cup for high temperature grease.

Temperature Control

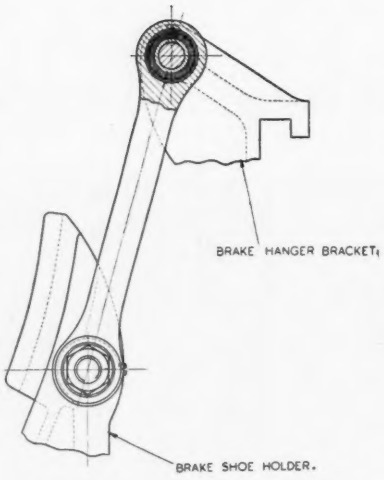
A bank of hand operated valves below the cylinder, facing the operator, controls the positive circulation of steam and water through the head section and, separately, through the cylinder walls. Water for cooling the stock screw enters and drains at the rear.

Power Transmission

Quiet, durable worm gears of desired speed ratio operate the stock screw through a Royle bonnet clutch. Smooth, vibrationless drive from motor to gear unit is by multiple V-belts. The motor base is adjustable for belt tension and reversible for front or rear drive. John Royle & Sons, Paterson, N. J.

Vibration and Torsional Bearings

APPLICATIONS of this bearing cover a wide field, and although originally designed as a flexible oscillatory bearing, it is finding many uses as an anti-vibratory medium. It consists essentially of an inner metal bush or tube and an outer metal concentric sleeve with a hollow rubber cylinder forced between the metal sleeves. In the assembly the longitudinal fibers of the elastic ring are stretched, and when it is in position, a radial compression force is exerted which tends to prevent slippage between the rubber cylinder and the sleeves. All relative movement between the inner and outer tubes is limited to a circular direction. The maximum angle of torsion may be



Application of Flexible Bearing

varied somewhat, but in practice approximately a 45-degree movement is allowed on either side of the neutral position. Bearings with large angular movements can be supplied to carry loads from 10 pounds up to 12 tons, or with smaller movements they are capable of supporting much larger loads.

Another product of similar construction, but varying design is used as an anti-vibration mounting under compression loads.

Advantages claimed are less exposure to heat, oil, etc., complete electrical insulation, and ability to carry very heavy loads. Silentbloc, Ltd.

Streamlined Plasticator

SMOOTHNESS of contour, a modern element of design for rubber machinery, is manifested in the new Gordon Plasticator. The elemination of protruding bolt heads and the introduction of unobstructed, flowing lines have been effected not only to improve its appearance, but to reduce to a minimum the work of keeping it clean.

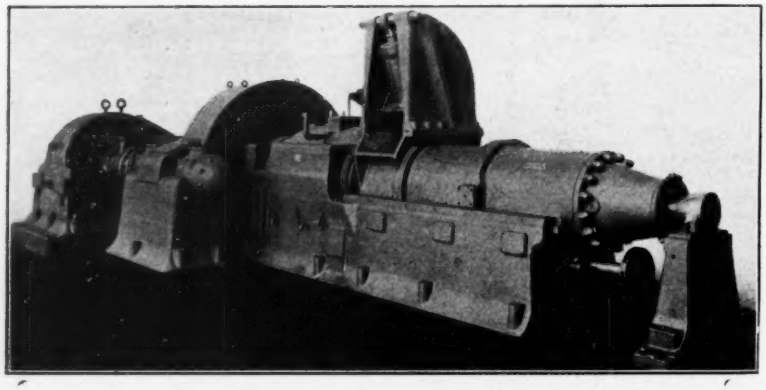
The trend toward streamlined design is based on the assumption that smoothness of outline makes cleanliness easy and cleanliness makes for accuracy and quality in production. Rubber factory mill rooms, with dusting powders and finely pulverized compounding material in constant use, have presented a difficult problem, and a large amount of costly straining has been necessary. Carelessness has been accentuated by the rough construction of machines. This new Gordon Plasticator is a contribution toward mill room efficiency and cleanliness. Farrel-Birmingham Co., Ansonia, Conn.

Press for Vulcanizing Balls

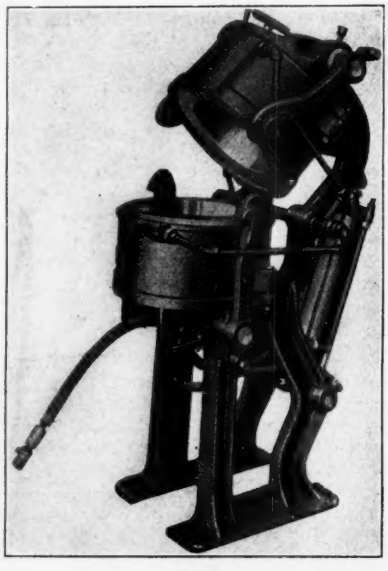
BALANCED basketballs and footballs are now being produced in a new type of press, designed to mold and cure the entire ball, including the cover. The press is a complete unit of rugged construction. Mold sections are steam jacketed, and the press is sealed by means of the air cylinder shown at the right in the illustration. By removing two bolts on both top and bottom platens, various sizes of molds within the dimensions of the platens can be interchanged. While in the press, the bladder or complete ball is inflated by air pressure, thus assuring conformity to the mold.

The rubber bladder or core of the ball is constructed on a suitable form and semi-vulcanized in the press. Conventional-type segments of either fabric or leather are attached to the semi-cured core with a rubber cement. The complete ball is then put into the press, using a slightly larger mold, and vulcanized, which action accomplishes complete curing of both rubber core and rubber cement.

A small rubber valve which is built into the rubber bladder at the start permits inflation by means of a hypodermic air needle. The valve is self-closing upon withdrawal of the needle. National Rubber Machinery Co., Akron, O.

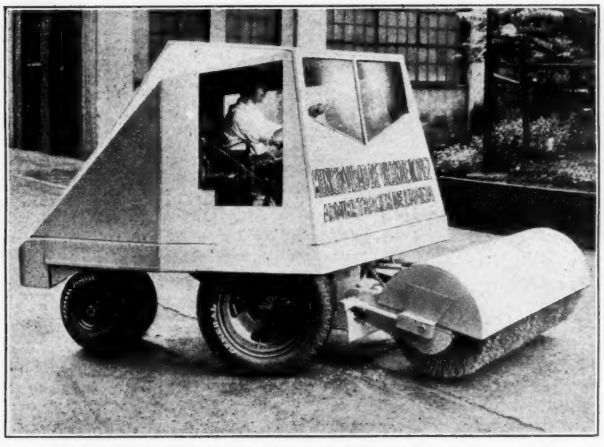


Modern Plasticator



Ball Vulcanizer

New Goods and Specialties



"La Cucaracha"

Improved Battery

Rubber-Tired Street-Sweepers

WHEN the "Municipalidad de Vicente Lopez" a suburb of Buenos Aires, Argentine Republic, ordered a large fleet of the unusual-looking street-sweepers illustrated herewith from a Cleveland manufacturer, the South American officials specified that each machine be plainly labeled "La Cucaracha," which means "The Cockroach." The softness of its General streamline Jumbo, Jr., pneumatic tires and the lightness of the machine itself make possible operating the sweeper on sidewalks as well as on paved streets. Divided among six tires,the weight is less than 700 pounds on each tire.

All controls on "La Cucaracha" are inside the cab, and the motors, transmission and rear driving axle or differential gearing are standard 1937 Chevrolet ton and a half truck parts. There are eight speeds on the broom and four speeds on the machine, and it has a turning radius of only 78 inches, while it sweeps a path 60 inches wide. Jumbo, Jr., tires are made by The General Tire & Rubber Co., Akron, O.

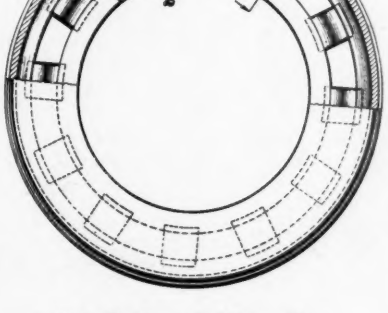
Airless Tire

A TIRE comprising a conventional casing and a specially constructed cushion insert is the subject of a recent patent.[1]

The primary object of the invention is to provide a tire of the desired resiliency without the use of air, thus rendering the tire puncture-proof. A further object is to provide a tire simple and durable in construction, reliable and efficient in use, and inexpensive to manufacture.

[1] U. S. patent No. 1,959,571.

The accompanying drawing is a side elevation view of a preferred embodiment of the tire, partly in longitudinal section. The numeral 1 denotes a conventional tire casing of the type adapted to receive an inflatable inner tube. A cushion insert adapted to be substituted for the inner tube is provided, which will give the tire the desired resiliency. The insert consists of inner and outer rubber rings 2 and 3, concentrically disposed in spaced relation and of arcuate shape in cross-section, with their flat sides disposed in confronting relation. The confronting sides of the rings are provided at uniformly spaced intervals with opposed recesses, to receive the solid rubber partitions, which resiliently support the rings in spaced relation. The ends of the recesses are angularly disposed, corresponding to the angularly disposed corners of the partitions, whereby the partitions are held against side-wise movement when mounted between the rings. The partitions are secured in place by the resiliency of the rings 2 and 3. The cushion insert, as a whole, is adapted to conform in shape to the inner contour of the tire casing so as to fit snugly within the casing.



Cross-Section of Airless Tire

In use it is claimed that when the cushion insert is inserted in a tire casing, it will impart to the tire the desired resiliency; while at the same time the tire will be rendered puncture-proof.

New "U.S." Battery

AN IMPROVED battery with several advantages over former types as now being marketed by U. S. Tire Dealers Mutual Corp., 1790 Broadway, New York, N. Y. Features of this new product are giant plates and triple sealed case construction. The former, with up to 26% more power generating surface, are said to provide quick starts, long life, and a large power reserve. The one-piece, acid-proof, triple sealed case construction, it is claimed, keeps the battery clean and dry; while the scientific design provides for more space, more acids, and more plates for that important reservoir of power essential for hard winter starts and long battery life.

New "Thiokol" Uses

CUSHIONING washers made of "Thiokol" are being used in the movable dial construction of telephones. As dial telephones are used in extreme ranges of temperature, fish oil is necessary to lubricate satisfactorily the moving parts at these temperatures. "Thiokol" washers have proven satisfactory inasmuch as they are not affected by this oil.

A new hose, designed for spraying

various types of lacquer and synthetic enamels, has an inner tube of "Thiokol D" which is highly resistant to lacquer solvents. The hose is of braided construction and has a cover of tough black rubber.

"Thiokol" road markers, bright yellow in color, are being used for the marking of pedestrian crosspaths at busy street intersections. The markers, said to be unaffected by weather exposure and dripping oil from cars, are installed by drilling a small hole in the highway and cementing the markers in place.

Neoprene in Facial Masks

LUCIEN LITTLEFIELD, Paramount's character actor, after twenty years of study on make-up methods has developed a system for changing facial contours that does not involve painful distortions. Mr. Littlefield builds up the face with pieces formed from Neoprene latex. The advantages of using this material are that it does not deteriorate from contact with oil or grease or does it fade when exposed to the powerful studio lights.

Koroseal Paper

TO A high-grade Kraft paper a thin coating of Koroseal (insoluble, thermoplastic, polymer of a vinyl halide) is applied. This Koroseal coating is reported to have the following properties: waterproof, grease and oilproof, air tight, corrosion proof, non-tainting and non-toxic, odorless, flexproof, heat resistant up to 200° F., light resistant, and completely resistant to oxidation. In addition the Koroseal coating is said to double the tear resistance of the paper and render it less inflammable.

Koroseal paper may be used for packaging foodstuffs, chemicals, medicinals, oils, etc.; for thin gaskets, flower pots, and various protective coverings. The Koroseal coating will not adhere to other surfaces, but forms a strong bond with itself when pressed with an electric iron. This paper, available in 200 yard rolls, 40 inches in width, has an overall thickness of 0.006 to 0.0065-inch of which approximately 0.0025-inch consists of the Koroseal coating. The B. F. Goodrich Co.

Hand Bendable Valve

Rubber Horseshoe

A PITCHING horseshoe for indoor and outdoor use is now made of a high-grade rubber compound in red or blue color, which is tough enough to withstand the abuse when pitched against iron stakes. Owing to its light weight, this shoe is particularly adaptable for use by women and children. Giant Grip Mfg. Co.

Pitching Shoe

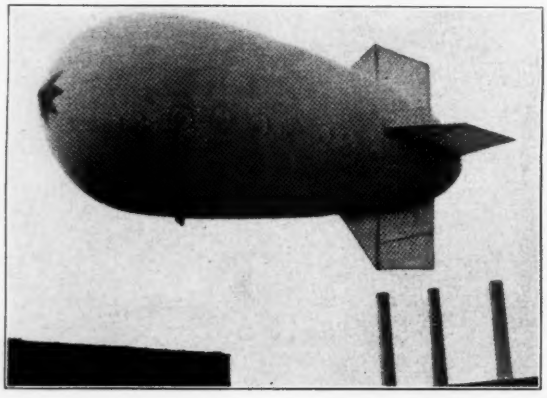
Bendable Tire Valve

A RUBBER covered valve for replacement in tire inner tubes may be bent by hand to any desired angle for use with wire, disk or other types of wheels. The valve insert is of special metal tubing, and bending which takes place below the valve mechanism will not close the air passage. The base of the valve is prepared for vulcanization to the tube, and bending may be done before or after application to the tube. This item eliminates the necessity of dealers stocking several styles of angle valves. A. Schrader's Son, Brooklyn, N. Y.

Advertising Balloons

SPHERICAL balloons from 7 to 12 feet in diameter and constructed of single ply, rubberized fabric are now used for advertising purposes. The balloons, when in use, are inflated with hydrogen gas obtained from bottles containing approximately 200 cubic feet of gas. Advertising copy is painted in dark blue on two faces of the yellow body, thus forming an effective color scheme. Requiring no skill or experience to operate, these balloons are shipped complete ready for inflation. The four available sizes are 7, 8, 10, and 12 feet in diameter, with gas capacities of 200, 268, 525, and 950 cubic feet respectively and correspondingly capable of lifting weights of 5, 8, 15, and 35 pounds.

Another development is the Zeppelin-shaped advertising balloon made of aluminized balloon fabric. It is approximately 25 feet long by 9½ feet in diameter at the largest point and has a capacity of approximately 1,080 cubic feet of hydrogen gas. This balloon, which is claimed to have great stability under high wind conditions, has a startling resemblance to a real airship. Because of its size three men are required to bag down the balloon when putting it out of use. Complete equipment in addition to the balloon, consists of a ground cloth, twenty empty sand bags, bagging down net, inflation hose, and 500 feet of ¼-inch flying rope with six feet of elastic shock absorbing cords to which the balloon is anchored. The Goodyear Tire & Rubber Co., Inc.



Captive Balloons for Publicity Purposes

Rubber Industry in America

EASTERN AND SOUTHERN

BUSINESS at present throughout the nation is at a decline from the earlier expected fall stimulation, but hopes are held for an upturn next year. One government agency reports that the letdown is characteristic of the ascending period in a business cycle and that factors associated with the termination of a major upswing are absent; thus the decline is only temporary. Emphasizing the dependence of demand on business conditions and the uncertainty of duration of the present recession, the report adds that prospects are "against a sufficiently early and vigorous rise in 1938 to bring the average of industrial activity and of consumer incomes up to that of 1937."

Another survey, from a business bureau, predicts extension of the present recession in general business during the first half of 1938 and a substantial upturn in the last half. The survey lists factors making for present conditions as including overproduction, accumulation of inventories, inflation of prices due to a previous rise in raw material and labor costs, labor disturbances, and the Far Eastern conflict. Here again it is stated that while the present recession may run several months, it does not mark the beginning of a major depression, for factors likely to prevent such an occurrence are present, particularly that the government attitude toward business is more conciliatory.

Reports received last month throughout the nation indicate that employment has lessened in industrial areas and working hours have been reduced in some instances, with a resulting decline in spending power. Applications for relief are gaining. Wholesale and retail trade have suffered.

In the South very good crops are reported. Cotton picking has just about ended, and farmers have either sold their cotton or secured government loans. The large cotton crop has released a great amount of cash, which stimulated retail buying considerably.

National Lead Co., 111 Broadway, New York, N. Y., will soon take bids for the construction of a lead smelter at Dallas, Tex.

General Dyestuff Corp., 435 Hudson St., New York, N. Y., plans a laboratory at 117-23 S. Second St., Philadelphia, Pa. The estimated cost is $50,000.

Raw Products Trading Corp., after December 1, will be located at Suite 1615, Graybar Bldg., 420 Lexington Ave. New York, N. Y.

New Laboratory of Columbian Carbon Co.

Leading manufacturers of printing ink in the New York Metropolitan area participated in a round table discussion of problems of their industry with the research staff of Columbian Carbon Co.'s new carbon laboratory, 214-44th St., Brooklyn, N. Y., on November 16. Subsequent discussions, in which representative companies will be invited to participate, will be devoted to rubber, paint, plastics, paper, and other industries utilizing the valuable properties of colloidal carbon.

Facilities in the new laboratory cover all the important applications of colloidal carbon. Special laboratories are devoted to paint, ink, rubber, and plastic technology and include, in addition to semi-plant manufacturing equipment, special apparatus for chemical and physical testing of colloidal carbon and products made with it. The laboratory occupies a modern four-story building with a total floor space of 11,880 square feet. The ground floor includes a museum and reception room where symposia on colloidal carbon problems are held. The remaining three floors are devoted to laboratory and semi-plant scale equipment.

The primary purposes of the laboratory are research on carbon and consumers' problems. Other research activities of Columbian Carbon Co. are conducted at Mellon Institute for Industrial Research, Pittsburgh, Pa., and at its Magnetic Pigments Division, Trenton, N. J.

New Company to Make Dated Tires

Earl Rubber Co., Pottstown, Pa., which expects to start operations next month, will manufacture the Earl tire on the sidewall of which will be stenciled the date before which it should be placed in service to return maximum mileage and safety. The company will make tires for pleasure cars and trucks in all popular sizes, besides producing camelback for the tire retreading and recapping fields.

The firm, which will occupy a long-idle, but large plant on North Hanover St. formerly housing rubber and tire companies, will utilize machinery now in the structure, and necessary additions will be made before the year-end. Production is planned to average 800 tires a day and to require about 175 employes. The company thus will be operating about 25% of capacity.

The Earl tire will be marketed directly to jobbers. Marketing methods will be different from those commonly used; advertising campaigns will be conducted in localities where Earl products will be placed.

J. L. Earl, who heads the new enterprise, has long been identified with tire selling. He had been employed by The Goodyear Tire & Rubber Co., Akron, O., Lee Tire & Rubber Co., Conshohocken, Pa., and Mohawk Rubber Co., Akron, in various sales executive capacities.

The new concern is capitalized at $200,000 preferred stock and $100,000 no par common. None of the shares, however, is on the general market.

The Sixteenth Exposition of Chemical Industries will be held the week of December 6 at Grand Central Palace, New York, N. Y. Among the products shown will be chemicals and chemical products, plant equipment, laboratory equipment and supplies, instruments, metals and alloys, electrical equipment, containers and packaging equipment, materials handling equipment, and publications on chemistry and allied subjects. The advisory committee is headed by M. C. Whitaker, vice president, American Cyanamid Co., 30 Rockefeller Plaza, New York. No admission fee will be charged at the exposition. Admission will be by invitation, by registration at Grand Central Palace, or by the badges of members of the American Society of Mechanical Engineers, which is holding its meeting in New York at the same time as the exposition.

Electric Hose & Rubber Co. recently opened a new and larger eastern sales office at Room 919, Nine Rockefeller Plaza, New York, N. Y. This office, occupying more than 600 square feet of floor space, will serve as headquarters for A. B. Dougall, general sales manager, and D. C. Smalley, manager of the metropolitan sales division. The company's general executive and administrative offices will remain at the factory in Wilmington, Del.

Flintkote Co., 50 W. 50th St., New York, N. Y., on November 3 elected to the directorate Frank H. Nehr, vice president and secretary.

Freeport Sulphur Co., 122 E. 42nd St., New York, N. Y., will construct a sulphur plant at Port Sulphur, La. The project, in abeyance since 1936, will cost about $300,000.

U. S. Rubber News

Address High School—John McGavack, chemist of the research laboratories (Passaic, N. J.) of United States Rubber Co., 1790 Broadway, New York, N. Y., recently addressed an assembly of Rutherford High School students on the rubber industry. His lecture illustrated by slides, concluded with a demonstration of the coagulation of latex.

Portland Branch — United States Rubber Products, Inc., recently leased 10,000 square feet of floor space adjoining its present location at N.W. Sixth Ave. and Glisan St., Portland, Ore., to secure a total of 60,000 square feet for its branch there.

75-Ton Trailer—The accompanying illustration shows a 75-ton trailer, claimed the largest on the Pacific Coast, which runs at 30 miles an hour and is used to convey steam shovels and contractors' equipment. Thirty U. S. tires inflated to normal pressure are used to carry the load.

New G & J Inner Tubes

The G & J Stalwart inner tube, a new, husky, all-black tube for high-speed, heavy-load, long-distance truck and bus operations, recently was announced by the G & J Tire Co., 1790 Broadway, New York. To combat the degenerating effects of excessive heat a special heavy-gage, heat-resisting rubber stock of great tensile strength has been used. To insure safety from trapped air blowouts the famous G & J channeled safety design, which permits the escape of all trapped air from between tube and casing, has been refined and improved to new efficiency. Another safety and economy feature, the Eger type, interchangeable, two-piece valve, insures a perfect seal between tube and valve. The Eger-type valve will not loosen, bend, or become damaged in service, it is claimed.

The G & J Big Six Classic tube, a new, heavy-duty passenger car inner tube, also was announced. With its rich, cream and black combination colors, this new tube strikes a modern note in eye appeal. It is constructed of heavy-gage, heat-resisting rubber throughout and in addition has a new pinch-proof, two-ply base, providing greater resistance to abrasion, rust and corrosion on the rim side.

One pound of under-inflation takes 600 miles from the life of the tire. The G & J Big Six Classic is equipped with a leak-proof rubber valve stem. Extra safety from blowouts is provided in this tube by its patented channeled construction, which eliminates sidewall blisters caused by air trapped between tube and casing.

New G & J Tires

A new de luxe line of safety tires, the G & J Big Six Classic and Big Four Classic, recently was announced as a companion line to the G & J Big Four and Big Six line. The new tire combines rugged skyline sidewall buttresses with a new six-row, bramble rib tread design, claimed to insure split-second, straight-line emergency stops under the most severe driving conditions. Besides its safety features the continuous, smooth-rolling tread with stone ejecting grooves is said to provide for easier steering and a smooth, quiet ride. To insure longer mileage the new Classic tires have a wider, flatter, extra-depth tread.

The company also announced a new Stalwart truck and bus tire containing the most advanced features of design and construction for modern, heavy duty tire demands. This new streamlined tire is said to provide new resistance to road impacts and blowouts, new gas saving economy, longer wear, and easier steering. Built in both balloon and high-pressure types, the new Stalwart line provides tires for all requirements of modern truck and bus transportation.

The Stalwart balloon has a new five-rib tread design which, with its deep grooves, is said to be air cooled, enabling the tire to dissipate heat more rapidly—a great advantage under today's high speeds. Its free rolling design is said to assure gas economy, longer wear, quieter operation, and easier steering.

The new high pressure tread was especially designed to give the extra traction needed by vehicles for general purpose hauling. This tread also is of flatter contour.

Wide tapering sidewall buttresses on both tires suggest the rugged, heavy duty construction of the carcass. The high tensile cotton cords in all body plies are latex treated for better insulation of cord material.

Multi-Tired Giant Trailer

Rubber Trade Association Elects Officers

At the annual meeting on November 18 of the members of the Rubber Trade Association of New York, Inc., 95 Broad St., New York, N. Y., the 1937 board of directors was reelected and two new members were added in accordance with action taken at a preceding special meeting when it was voted to increase the number from seven to nine. Of the new 1938 board of directors listed below the last two are newly elected: Robert Badenhop, Robert Badenhop Corp.; Wm. E. Bruyn, Littlejohn & Co., Inc.; A. L. Grant, Chas. T. Wilson Co., Inc.; L. V. Keeler, The Avia Co.; H. Muehlstein, H. Muehlstein & Co., Inc.; D. A. Paterson, H. A. Astlett & Co.; W. G. Smith, Jr., The Meyer & Brown Corp.; J. Louis, Carl M. Loeb & Co.; and Philip Billhardt.

The new board of directors unanimously elected the following officers for the ensuing year: president, Herman Muehlstein; vice president, A. L. Grant; treasurer, Louis V. Keeler. The board also reappointed B. G. Davy as secretary-manager.

A. L. Viles, president, Rubber Manufacturers Association, Inc., 444 Madison Ave., New York, N. Y., and **J. J. Blandin,** head of the Crude Rubber Department of Goodyear Tire & Rubber Co., Akron, O., sailed November 17 on the *Queen Mary* to attend the meeting November 30 of the International Rubber Regulation Committee in London, England.

Mallinckrodt Chemical Works, 72 Gold St., New York, N. Y., now markets the "New Bell Closure" for acid bottles, which, it is claimed, is liquid-tight, gas-tight, dirt-proof, and interchangeable. The device consists of a plastic cap, rubber cushion ring, and glass disk. Turning the cap presses the glass plate firmly against the flatly ground edge of the bottle neck, making a seal said to be proof against leakage.

Tire Prices Up

United States Rubber Co., 1790 Broadway, New York, N. Y., recently raised tire prices 2 to 6%. First-grade tires for small cars went up 2 to 3% and those for larger cars about 3%. Prices of third-line tires were increased 5 to 6%. These adjustments were said to reflect necessary revisions to establish a more normal relation between manufacturing costs and selling prices.

Soon after, the General Tire & Rubber Co., Akron, listed price increases of 1 to 5%; while The B. F. Goodrich Co., Akron, announced several minor revisions, mostly small increases.

New York Auto Show

The 1937 Automobile Show was held under the auspices of Automobile Manufacturers Association, Inc., at the Grand Central Palace, New York, N. Y., from October 27 to November 3. On display were 22 different makes of passenger cars, seven of trucks, and 15 makes of trailers.

It is apparent that rubber is vitally important in the construction and per-

formance of the new models. In fact, practically all essential parts are suspended in rubber of some form, which contributes to the increased smooth performance and vibrationless riding comfort of the 1938 automobiles.

Rubber engine mountings are used in a variety of forms; in some cases the rubber mountings are bonded to steel. Molded rubber hose is used between radiator and engine water-outlet to eliminate metal elbow fittings. Bodies are mounted through intermediaries such as rubber spools which act as cushions and prevent metal-to-metal contact with the frame. Steering gears are cushioned in rubber so as to prevent the transmission of frame vibrations to the driver's hands. Exhaust systems are suspended in rubber, and a rubber insert is used in universal joints.

Spring shackles and brackets have rubber cores. The new flexible coil springs have within them bumpers of soft rubber. There is also the new rubber floated spring-to-axle housing mounting. Knee-action mechanisms utilize torsional rubber bearings. A newly designed ride stabilizer consists of a steel bar mounted in rubber on the frame and connected to the front axle by rubber cushioned links.

Compositions of rubber are used for insulating the body against vibration and noise. Body tops are reenforced with rubber-insulated steel crossbows. Front and rear windows are set in rubber, and doors utilize rubber cushions as silencers. Molded sponge rubber arm rests, recessed to provide elbow room, add to riding comfort.

Synthetic rubber is gradually finding its sphere of unique usefulness on the automobile. One of the most recent applications is the use of synthetic rubber seals on knee-action linkage to provide an oil-resistant permanent seal. A cork and synthetic rubber seal is being used on water pumps, and synthetic rubber tubing is finding use as a flexible unit on hydraulic braking systems.

With these numerous applications of rubber the slogan for the 1937 Automobile Show "Putting the World on Wheels" may well have been "Putting the World on Rubber."

WPA Spends $1,188,000 for Rubber Goods

Tires and rubber goods valued at $1,188,706 were included in the nearly one-half billion dollars worth of materials, supplies, and equipment purchased for projects of the Works Progress Administration during the first 26 months of its operation up until September 1, 1937, according to records of the WPA Division of Research, Statistics and Records. Of this amount $807,068 was in federal funds from various relief appropriations and $381,638 was in funds of the sponsors of the projects.

In the same 26-month period the records show the WPA, in federal and sponsors' funds, to have expended $173,872,383 in the rental and services of trucks, vans, buses, and autos. The part of this total ultimately expended by private owners on tire replacements could not be estimated with accuracy, but undoubtedly it was a large sum in the aggregate. These figures do not include the value of tires and rubber goods included as incidental in purchases of motor trucks and various kinds of machinery and equipment.

The use of rubber boots was compulsory on all types of WPA projects involving encounters with water to a considerable degree, and constant use made their replacement a fairly important item.

Texas "WYEX" Black

About a year ago J. M. Huber, Inc., 460 W. 34th St., New York, N. Y., introduced an improved type of carbon black under the brand name "Wyex." At that time its production was limited to the Huber plant at Lance Creek, Wyo., where a peculiarly suitable type of natural gas was available as raw material. But now Huber announces that it has finally succeeded in developing the identical "Wyex" quality in a specially designed type of unit recently completed at its Borger plant in the Panhandle of Texas. This makes "Wyex" Black, compressed and compact (granulized), available to export and coastwise destinations where consumers have heretofore been obliged to pay a higher freight cost by reason of the inland location of the Wyoming plant.

Huber also reports a steadily increasing demand for "Wyex," attributed to its remarkable processing and superior aging characteristics.

Rubber in Super Car

Although only 23 years old, Rust Heinz, young scion of the Pittsburgh House of Heinz, has evolved one of the most striking and revolutionary motor cars ever conceived, which he calls the "Phantom Corsair." Four passengers ride abreast in the front seat and two more in the interior rumble seat. The "Phantom Corsair" has neither fenders nor running boards.

The car is built with front-wheel drive, electric gear shift, four forward speeds, and develops a speed of 122 m.p.h. with a small engine. The wheels are independently sprung and mounted on General-made, multi-vane Dual 10 tires. The hydraulic double-action set-type shock absorbers are adjustable at the dash, and thermostatically controlled air conditioning provides either heat or cold.

The interior is lined throughout with slab rubber in all places where injury might occur to occupants during an accident. The seats are molded of cast rubber, without springs, and the ceiling and interior sidewalls are lined with cork composition ¾-inch thick. There is a layer of sponge rubber under all upholstery; while the steel crash-board has a two-inch thick rubber covering—everything sound-proofed and shock-proofed.

All of the glass is bullet-proof, for safety, is tinted green to prevent glare, and is slanted inward toward the top, eliminating reflections. The roof doors open simultaneously and automatically with the regular doors.

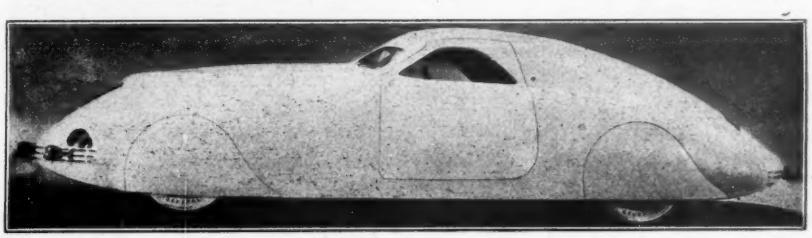
Young Heinz, educated at Andover and Yale, followed naval architecture in New York until he designed and developed the "Phantom Corsair" on the West Coast. Preliminary models were studied in a wind-tunnel of his own design. He is now busy in Pasadena on several other unusual cars that he has been commissioned to build.

Claims for Rubber from Poinsettia Unwarranted

Extravagant claims as to the rubber possibilities of the Christmas plant, *Euphorbia pulcherrima*, commonly known as poinsettia, are not supported by studies by both the Department of Agriculture and by independent investigators. The studies have not shown a sufficiently high rubber content to encourage hopes of commercial rubber production. The plant is a native of Mexico.

It is quite easy to differentiate the latex of poinsettia from that of the *Hevea* rubber tree, which is available commercially in the United States, say Bureau of Plant Industry rubber specialists. The most simple test is by the odor. The latex of *Hevea* is preserved by the addition of ammonia, the odor of which can be easily recognized. The latex of poinsettia, on the other hand, is coagulated by ammonia, and any latex with the characteristic odor of ammonia could not be from poinsettia.

Microscopically, the latex particles of poinsettia are quite different from those of *Hevea*. *Hevea* particles are oval or pear-shaped, often with a distinct "tail;" while the particles in poinsettia are spherical and distinctly smaller than the *Hevea* particles. *U. S. Dept. of Agriculture.*



The "Phantom Corsair"

OHIO

IN OHIO decreasing employment is quite general and in some cases against the seasonal trend. In many instances the curtailment has taken the form of fewer working hours for an unchanged number of employes. Rubber, steel, automobiles, and building construction all report lessening activity. A bright spot in the picture, however, is the fact that rubber machinery builders and mold makers are quite busy.

General Tire News

Inactivity of Capital

Relative to present business conditions and the underlying influences, Wm. O'Neil, president, General Tire & Rubber Co., Akron, has expressed his views in a concrete manner.

"Strikes by capital, large and small—by the little capitalist who is planning to spend a few thousand dollars in the building of a house as well as by the larger capitalist who has hundreds of thousands of dollars to invest in industry or commerce—explain the reason for the present uncertain and unsatisfactory condition of American business. The very large capitalist is on a strike because he is faced with an 80% tax on his profits on stocks, which is not subject to deduction for subsequent losses. . . . The small-time capitalist . . . won't build the house that he needs . . . because labor agitation, particularly in the best-paid industries, makes costs, building conditions, and the permanence of industrial operations and employment so uncertain.

"Private building should be the biggest industry and it should employ the most labor. Government projects are always maintained on borrowed money. . . . Because the private building industry is lagging, we have a surplus of labor. This surplus is being pushed into the going industries, and the old-time employe, entitled to full hours in an industry that is busy, is being forced to share his hours. . . .

"When both large and small capital is on strike, a sensible stock-taking of the causes that have brought about this condition should lead to the eradication of the reasons for present situation.

"What are the remedies for the present state of affairs?

"First, to restore the confidence of the investing public, the government should not insist that a corporation, which is in debt, without sufficient capital to operate safely otherwise, must pay out all of its earnings in dividends.

"Second, it should be made possible for banks to lend money to corporations, with the knowledge that, as the corporations earn money, the indebtedness will be reduced, and it will not be necessary to pay out all earnings in dividends.

"Third, the capital gains tax should be changed so that if a person loses money one year and makes a profit the next year, he can at least deduct his losses for a few years.

"The undistributed surplus profits tax is not hurting the big companies with plenty of cash reserves, but it is hurting the expanding business, the new business, and it hurts every little fellow in business. . . .

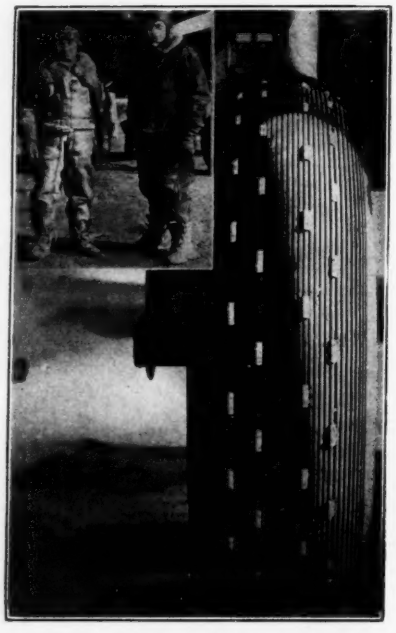
"Until these things are remedied, I can see no permanently favorable business prospect ahead.

"There is a tremendous latent consumer demand. We need more houses, we need more good roads, we need more manufacturing facilities, but we can't have them with the constant labor agitation which has induced, directly or indirectly, the current strike on the part of both big and little capital.

"Confidence has to be restored in the capital markets before it will be possible to have the expansion in all lines of business necessary to replace normal business mortalities."

Steel Cleats in Airplane Tires

The U. S. Army Air Corps has been experimenting with steel cleats embedded in the multi-vaned tread of the General Dual 10 airplane tires on many of the Air Corps' planes. While the flexible rubber vanes of the squeegee tread on the low-pressure streamline tires provide maximum traction and adhesion to wet or dry runway surfaces, Air Corps engineers believed they might increase the clinging power of the tires on smooth ice if sharp steel cleats were embedded into the tires so that they would bite into the smooth ice sometimes encountered in mid-winter landings.



U. S. Army Air Corps Official Photograph

Airplane Tire in Which Steel Cleats Are Embedded. Insert Shows Col. W. H. Frank and a Fellow Air Corps Officer

Air Corps engineers are studying and analyzing the results of the tests carried out at Selfridge Field, Mich., under the direction of Col. Walter H. Frank, commander of the cold weather equipment test group. Further development of this equipment is now being conducted by the Material Division of the Air Corps at Wright Field, Dayton.

"Miss Streamline II"

After three years of business travel in the service of General Tire executives and officials to all parts of this country and neighboring ones, "Miss Streamline I" recently was retired and farmed out to a Mexican transport concern. Her successor, the eleventh airplane to carry the company's colors, is now in operation.

"Miss Streamline II" is equipped with the most modern aids to aviation that science has devised. Two-way communication with the ground will be possible through its radio Station KHAGI. Radio also will guide the plane itself, as it is equipped with a new-type Siebenthaler outside directional loop, which is rain, snow, and static proof, for radio direction finder. The ship itself is a Lockheed Vega DL-1 high-wing metal plane, powered with a Pratt & Whitney Wasp, S-1 D-1, 550 H.P. motor, with cabin accommodations for four passengers and the pilot. Its three complete fuel systems include a hand auxiliary, force-feed, wobble-type of auxiliary fuel control pump; a gravity system; and a mechanical, engine-driven Romec system. The propeller is a Hamilton standard controllable type, and the ship is complete with full night-flying equipment, even to electric flares. Its tires are 36-inch General streamlines.

Goodrich Notes

Some Interesting Facts about Rubber Industry

Some interesting facts on the rubber industry, particularly in its relation to the automotive industry, were related by T. G. Graham, vice president of The B. F. Goodrich Co. in a recent broadcast from the company's principal headquarters in Akron. Among the highlights are the following:

Eighty per cent of the products made by the rubber industry are used in automobiles. The rubber industry manufactures more than 180 parts used in the automobile in addition to tires.

The American rubber industry uses

about 1,250,000,000 pounds of rubber annually, and Goodrich alone requires the output of more than 50,000,000 rubber trees. The services of 170,000 native workmen on the plantations in the Far East are needed every year to collect the rubber latex or sap from these trees for Goodrich requirements.

The first pneumatic tire for an automobile was produced in 1896. Tire improvement was gained painstakingly, step by step, through constant study, experimenting, and testing, thus keeping pace with the advances in automotive engineering, rapid and remarkable as they have been. Tires are now made for many vehicles ranging from wheelbarrows to modern transport airplanes weighing 60,000 pounds and built for 40 passengers.

Thirty years ago the average motorist had an annual tire bill of $176. Today the average car owner spends less than a tenth of that amount for six or seven times the tire mileage.

It is estimated that an average automobile tire represents the total amount of latex taken from two rubber trees for a whole year.

Foremen's Club Election

The all-divisional Goodrich Foremen's Club recently held its annual election with the following results: president, Roy Thomas, Dept. 6595; vice president, A. D. Brown, Dept. 6615; secretary, Clarence Ziegler, Dept. 7820; financial secretary, T. E. Boyle, Dept. 6245 (reelected, second term); treasurer, Grant McCort, Dept. 6161 (reelected, fourth term).

Mr. Thomas, secretary for the past year, succeeds Wm. K. Blank. The latter and other past presidents were presented with life memberships to the organization. The other recipients are George Anderson, M. D. Griffiths, and Jack Mann.

Goodyear Activities

New Director—The Goodyear Tire & Rubber Co., Akron, at a recent meeting of the directorate elected Newton D. Baker, formerly on the board, a director to fill the vacancy caused by the death of Col. Grayson M.-P. Murphy.

Operations Resumed—On November 10 Goodyear resumed operations in its passenger car tire production departments shut down since October 28, thereby reinstating several thousand workers. Goodyear Plant No. 1, confined largely to manufacturing truck tires, was closed only three days for inventory taking.

British Service Manager—Frank H. Jordan, Goodyear service manager in England, recently visited Akron for a few weeks to study American methods and attend the service manager's school.

Promoted to Java—Mervin E. Barr, supervisor in Dept. 251A, goes to Java in January to take up new duties in charge of production control and stores at the Goodyear plant there.

N.A.F.C. President—H. G. Evans, of

H. G. Evans

Goodyear's Production Control, an executive vice president of the National Association of Foreman's Clubs, was elected president at the annual convention recently held in Detroit, Mich. Next year's affair will be held in Akron. A large delegation of Goodyear men attended the 1937 event, including two scheduled for important parts on the program: A. C. Horrocks, of Goodyear Industrial University, and L. D. Hochberg, of Goodyear Hall.

Canadian Plant—Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont., Canada, recently awarded a contract for the construction of a factory in Bowmanville, Ont., at an estimated cost of $350,000.

Pittsburgh Plate Glass Co., 3849 Hamilton Ave., Cleveland, plans construction of a warehouse and a top addition to its factory at an estimated cost of $50,000.

Firestone Tire & Rubber Co., Akron, at the regular October meeting of the Suggestion Board awarded 17 employes a total of $220 for valuable ideas submitted. R. K. Spriggel and Merle Alexander each received $35 to lead for the month. Other awards for $25, $20, $15, $10, and $5 made up the balance.

The Barr Rubber Products Co., Sandusky, this year celebrated its seventeenth anniversary. Barr made great progress during 1937. Mounting sales under the guidance of A. D. Benedict, vice president in charge of sales, necessitated expansion in every direction. Office and shipping facilities were recently doubled by the acquisition of a new building. The laboratory and compounding departments are now located in another new building; while manufacturing floor space has been increased by 18,600 feet. This expansion program, moreover, will definitely be continued through 1938. The firm makes toy balloons, rubber balls, and molded and dipped novelties.

NEW JERSEY

THE majority of New Jersey rubber manufacturers experienced a decline in business and, consequently, have been compelled to lay off some employes. The manufacturers, however, are optimistic and believe that conditions will again be normal by early winter. Some plants continue to operate overtime making certain mechanical goods. The shoe and heel trade has shown an increase, and orders are reported larger.

Puritan Rubber Co., Trenton, after business dropped off somewhat reduced working shifts.

Essex Rubber Co., Trenton, reports a normal season, and officials are looking for a decided improvement in business. Lawrence M. Oakley has been visiting the trade throughout New England.

The Thermoid Co., Trenton, has purchased two tracts of land adjoining its plant from the Pennsylvania Railroad Co. for further expansion.

Acme Rubber Mfg. Co., Trenton, is busy in some departments; while others show a falling off in production. President Horace T. Cook, his wife, and three children have returned from Fisher's Island, N. Y., to their home at Princeton, N. J. Mr. Cook is also president of the Hamilton Rubber Mfg. Co., Trenton.

Mercer Rubber Co., Hamilton Square, is operating with a night shift in some departments, with prospects good for a busy early winter trade.

Pierce-Roberts Rubber Co., Trenton, has found it necessary to cut down on three shifts because of a curtailment in orders. The company expects to take on extra help later in the season.

Jos. Stokes Rubber Co., Trenton, reported a drop in orders the past few weeks. The company's Canadian plant is operating normally.

Pocono Co., Trenton, decreased output, but expects business to pick up shortly with fall orders for automobile cloth.

Near Para Rubber Co., Trenton, manufacturer of reclaimed rubber, finds business recently declined.

Lambertville Rubber Co., Lambertville, is experiencing a busy season under President John T. Crowley, appointed temporary trustee. The concern, with 400 employes, is turning out 7,000 pairs of rubbers, gaiters, galoshes, and tennis shoes daily; half of the output is tennis wear. The company has adopted a new policy and is now dealing direct with jobbers instead of the retail trade as formerly.

MIDWEST

INCREASING unemployment is a serious problem also in the Midwest, although to date the figure is not so high as during 1936. Factories have been working off inventories after hitting high stride during the second quarter. Consequent shutdowns and reduced schedules, stimulated by reaction to higher taxes and the stock market slump, has decreased the buying power of employes directly connected with industrial operation.

Steel production has dropped further, and shoe output has lessened because of lack of sales and losses of contracts to foreign competitors. Railroads, too, have been compelled to lay off help. Building has declined greatly because of the indefiniteness of the future and the excessive cost of construction.

A government bureau recently released the following outlook for the automobile industry. "The reported relatively minor nature of the changes in models for 1938, the higher prices asked, the expected more stringent terms for financing purchases of both new and second-hand cars, and the change in direction of stock prices and incomes may result in a smaller replacement demand for automobiles in 1938."

However, increased agricultural crops should have a stabilizing effect provided sufficient confidence can be established to stimulate buying.

Rubber Industry Generous

The rubber industry of Chicago took an active part in the city's Community Fund drive for $3,550,000 this year, reaching its established quota of $7,500 several weeks before the campaign ended. Under the chairmanship of U. L. Harmon, vice president of the Dryden Rubber Co., 3,000 employes of the rubber industry undertook raising their quota with gusto, and they were among the first of the 54 industrial divisions of the fund to go "over the top."

"We are pleased to know that the Rubber Group was aggressive and active in the campaign and that we were the third unit to get the gold star which is emblematic of reaching the quota," Mr. Harmon said.

R. E. Hedlund, assistant district manager of tire sales, United States Rubber Products Co., Inc., was Mr. Harmon's co-chairman. Following is the list of captains who helped solicit the employes of the rubber group in the fund drive: James S. Barrie, sales manager, Hood Rubber Co.; M. J. Bournonville, vice manager, Fisk Tire Co., Inc.; Robert Gunther, president, Inland Rubber Co.; Earl Hathaway, assistant district manager, Firestone Tire & Rubber Co.; Harry Hood, vice president, Featheredge Rubber Co.; Carl Judsen, vice president, Judsen Rubber Works; Harold O'Connor, assistant sales manager, Goodyear Tire & Rubber Co.; Thomas Oliphant, Williams-Bowman Rubber Co.; Ralph G. Wine, U. S. Rubber Co.

Lavelle Rubber Co. recently purchased a vacant plot 192 by 126 feet at the corner of Hubbard and Wood Sts., Chicago, Ill., at a reported price of $10,500. On it will be constructed a one-story office and warehouse building to meet the need of larger quarters. The firm, which manufactures bath plugs, float balls, etc., is now at 320 W. Illinois St., Chicago, and has a branch at Milwaukee, Wis.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., recently acquired the plant at Fort Madison, Iowa, formerly occupied by the Perfection Tire Co. and plans to alter it for manufacturing paint and enamel. The estimated cost is $40,000.

Van Cleef Bros., Chicago, Ill., has announced that the partnership existing among Noah, Maxime, Felix, and Paul Van Cleef at the close of business on August 31 was dissolved by the withdrawal of Maxime Van Cleef. His interest in the partnership property and business has been acquired by his three brothers, who will continue the business under the old name.

The Davis Rubber Co., Little Rock, Ark., utilizes the fabric from scrap tires in the manufacture of bridles for horses and mules. The worn casings are skinned of tread stock, buffed, cut into strips of proper length, and then the necessary metal parts are attached, as bits and buckles. These bridles are sold to hardware and general stores and saddlery shops in the South and Southwest. Advantages claimed are that these bridles are low in price, strong, will last indefinitely, and will not harden with use.

LEGAL

F.T.C. Goodyear Order Set Aside

On November 5, 1937, the United States Circuit Court of Appeals for the Sixth Circuit set aside the cease and desist order issued by the Federal Trade Commission on March 5, 1936, against the Goodyear Tire & Rubber Co. in respect to the Commission's complaint of September 13, 1933, charging violation of Section 2 of the Clayton Act by discriminating in the price of tires between those sold in interstate commerce to Sears, Roebuck & Co., and those sold to independent Goodyear dealers. On April 5, 1936, the Goodyear Tire & Rubber Co. filed the petition for review which has now been decided.

On June 19, 1936, the Congress enacted the so-called Robinson-Patman Act, whereby Section 2 of the Clayton Act was amended *inter alia* to provide "that nothing herein contained shall prevent differentials which make only due allowance for differences in the cost of manufacture, sale or delivery, resulting from the differing methods or quantities in which such commodities are to such purchasers sold or delivered."

The judges' decision describes the point at issue as follows:

"The essential dispute in respect to the foregoing proviso is this: The petitioner contends that a discrimination in price is permitted if based upon the quantity of the commodity sold, and that a discrimination in price is also permitted that makes due allowance for difference in the cost of selling or transportation; that since its discrimination in favor of Sears Roebuck was approximately only 7% over and above a due allowance for difference in cost, it was not an unreasonable discrimination attributable to the great quantity of tires purchased by Sears Roebuck, that its effect did not substantially lessen competition, had no tendency to create monopoly, and so the petitioner did not offend against the statute. The Commission, however, contends that while the proviso permits discrimination on account of differences in quantity of the commodity sold, such discrimination is limited to the saving in cost of selling or transportation, and that all differences in price beyond such saving threatens competition, tends to monopoly, and so violates the statute."

At the end of a lengthy discussion the decision concludes with: "We give consideration . . . when we set aside, as we do, the order of the Commission and remand the case but without direction to the Commission to dismiss the complaint and without prejudice to its filing a supplemental complaint in the original proceeding if under Section 2 of the amendatory act this may now be done, concerning which we express no opinion. It is so ordered."

Patent Suits

1,573,497, E. J. Kroeger, Method and apparatus for making hollow articles; 1,549,177, J. T. Allen, Rubber molding apparatus; 1,623,022, H. M. Sturgeon, Molding press apparatus; 1,731,891, D. H. Felch, Hydraulic press, filed Aug. 9, 1937, D. C. Dela., Doc. E 1216, *Continental Rubber Works* v. *American Container Corp.*

1,808,429, H. R. Minor, Method of regulating and maintaining heat transfer; 2,066,265, H. A. Freeman, Method of curing tires, filed Aug. 13, 1937, D. C., N. D. Ohio (Cleveland), Doc. E 5633, *The Liquid Carbonic Corp.* v. *The Goodyear Tire & Rubber Co.*

T. M. 74,765, Ford Motor Co., Explosive engines and their parts; T. M. 119,956, same, Electrically self-propelled vehicles and their parts; T. M. 266,453, same, Vehicle gasoline tanks, bolts, gaskets, etc.; T. M. 125,702, same, Rubber tires; T. M. 257,500, same, Spark plugs, electric switches, starter motors, etc., D. C., N. D. Ill., E. Div., Doc. 15,600, *Ford Motor Co.* v. *Heyne Motor Co. et al.* Injunction Apr. 9, 1937.

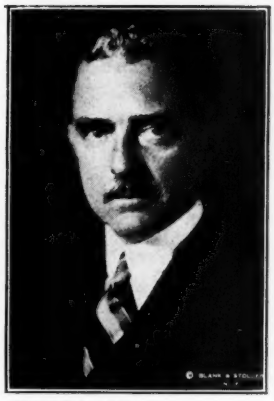
NEW ENGLAND

IN NEW ENGLAND the decline in plant activity was more general and appeared here in advance of many other sections of the country. Already some textile and footwear manufacturers have requested employes to accept "voluntary" pay cuts ranging from 5 to 10%. Hours of work also have been reduced, and many industries are rotating employment. There is a predominating feeling of unsettlement and an eager watchfulness as to legislative developments which must necessarily reflect the government attitude toward the dependence of business revival on equitable consideration for labor, capital, and the consumer.

The Associated Industries of Massachusetts at an annual meeting and industrial conference recently held in Boston gave 11 concerns in the western Massachusetts area special awards in the A. I. M. merit court of honor. The awards were made for outstanding developments in the state's industries in the field of manufacture and industrial development. These jury awards were made on the basis of industrial research, style advancement, and greatest development of goods for use. Among the firms honored were The Fisk Tire Co., Chicopee Falls, for its contribution to greater motoring safety in the field of tire manufacture; and A. G. Spalding & Bros., Chicopee, for improvements in the construction of volley, soccer, and basketballs and golf clubs.

Hotchkiss Elected Head of Cambridge Rubber Co.

Cambridge Rubber Co., Cambridge, Mass., recently elected as president H. Stuart Hotchkiss, who has been connected with the rubber industry for 30 years. Mr. Hotchkiss was formerly a vice president of the United States Rubber Co., and president of the General Rubber Co. and United States Rubber Plantations, Inc. In addition to the subsidiaries of Cambridge Rubber Co., in Canada and Maryland, its associated company, the Vultex Chemical Co., Cambridge, has been for many years one of the leaders in the development of rubber latex processes and products.



Blank & Stoller

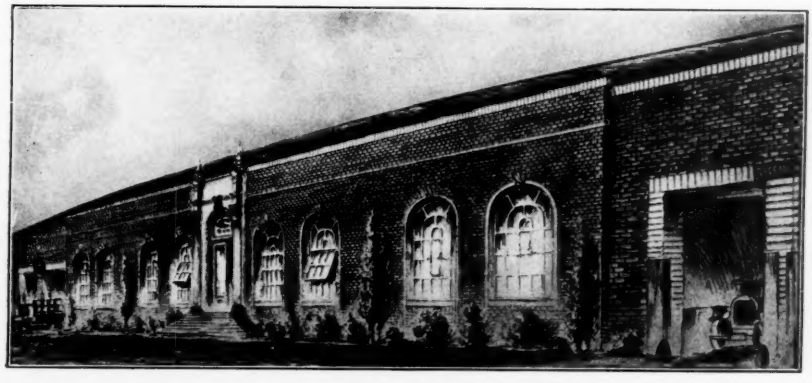
H. Stuart Hotchkiss

Sales Manager for G-E Conduit and Wire

F. A. Parnell has been appointed sales manager of the General Electric conduit and wire sales section, Bridgeport, Conn., according to J. H. Crawford, manager of the construction materials division. A. E. Newman is manager of the section. Mr. Parnell was formerly manager of sales promotion for construction materials. Mr. Parnell joined General Electric in 1929 as a member of the advertising division of the appliance and merchandise department, specializing in automotive products. He became the head of advertising and sales promotion for construction materials in 1931.

PACIFIC COAST

Western Insulated Wire, Inc., recently completed construction of its plant at 1001 E. 62nd St., Los Angeles, Calif. The firm will manufacture all types of rubber covered wire as flexible cord, heater cords, building wire, cord sets, etc. A. D. Nast, Jr., formerly of Sickle, Heath & Nast, Chicago, Ill., is president; and the vice president is E. H. Lewis, former designing engineer in charge of wire and cable of General Electric Co., Schenectady, N. Y., and later general manager of the Hatfield Wire & Cable Co., Hillside, N. J.



Architect's Drawing of Plant of Western Insulated Wire, Inc.

CANADA

The Stedfast Rubber Co. (Canada) Ltd., Granby, P. Q., Canada, recently was awarded a certificate of merit in the Quebec Association for the Prevention of Industrial Accidents for operating during the year 1936-37 without an accident involving loss of time to any employe. This is the only factory in the district to win this award.

Canadian Exports for September[1]

During September, 1937, Canada exported 64,903 tire casings, value $654,584, and 45,658 inner tubes, value $60,911. To the United States went 39 casings, value $666, and 19 inner tubes, value $64. For the first nine months of 1937 Canada's tire exports reached 690,172, value $6,822,276, and inner tubes, 462,856, value $570,582. Of these the United States took 9,487 tires, value $41,650, and 131 inner tubes, value $318.

In September Canada shipped 682,756 pairs of boots and shoes, value $592,778; 80,520 pairs of canvas rubber-soled shoes, value $45,118; 568,942 pairs of rubber heels, value $18,800; and 142,214 pairs of rubber soles, value $16,471. U. S. imports of these follow: boots and shoes, 7 pairs, value $16; canvas rubber soled shoes, 105 pairs, value $131. For the first nine months this year figures for Canadian footwear exports were: boots and shoes, 3,595,929 pairs, valued $3,321,479; canvas rubber soled shoes, 1,773,650 pairs, value $849,856; rubber heels, 3,838,867 pairs, value $141,041; rubber soles, 1,579,140 pairs, value $171,050. U. S. takings amounted to 52 pairs of boots and shoes, value $166; 292 pairs of canvas rubber soled shoes, value $273; and 56 pairs of rubber soles, value $10.

Canadian footwear imports in September contrasted with August figures follow: 15,683 pairs of boots and shoes, value $16,234, against 1,482 pairs, value $1,549; and 1,306 pairs of canvas rubber soled shoes, value $600, against 2,220 pairs, value $654. Of these the United States supplied 1,261 pairs of boots and shoes, value $1,320, in August and 15,664 pairs, value $16,213, in September.

[1] For details by destination countries see Monthly Statement No. 3710 (Part 1) and No. 3709, issued by the Leather and Rubber Division, U. S. Dept. of Commerce, Bureau of Foreign and Domestic Commerce, Washington, D. C.

FINANCIAL[1]

Unless otherwise stated, the results of operations of the following companies are after deductions for operating expenses, normal federal income taxes, depreciation, and other charges, but before provision for federal surtax on undistributed earnings. Most of the figures are subject to final adjustments.

American Cyanamid Co., 30 Rockefeller Plaza, New York, N. Y., and subsidiaries. Nine months to September 30: net income, $4,235,957, equal to $1.68 each on 2,520,368 combined class A and B shares. This is compared to $2,803,266, or $1.11 a share a year earlier. September quarter: net income, $1,391,632, or 55¢ a share compared to $1,479,685, or 59¢ a share in the June quarter and $1,095,263, or 43¢ a share in the September quarter of 1936.

American Cyanamid class A stockholders, at a special meeting October 25, authorized an issue of $6,000,000 4% sinking fund debentures, due October 1, 1957.

American Zinc, Lead & Smelting Co., Columbus, O., and wholly owned subsidiaries. September quarter: net profit, $119,647, equal, after dividend requirements on 66,253 shares of $5 convertible prior preferred stock and 2,212 shares of old $6 preferred stock not yet deposited under recapitalization plan (on which dividend accumulations on September 30, 1937, totaled $91.50 a share), to 5¢ each on 662,868 common shares outstanding at the close of the period. This compares with $81,074, or $1.25 each on 64,834 shares of $5 prior preferred stock, in the preceding quarter and net loss of $8,448 in the third quarter of 1936. Nine months to September 30: net profit, $293,252, equal, after preferred dividend requirements, to 5¢ a common share, contrasted with net loss of $1,084 last year. Twelve months to September 30: net profit, $386,673 after charges and $425 surtax on undistributed earnings.

Anaconda Wire & Cable Co., 25 Broadway, New York, N. Y., and subsidiaries. Preliminary report for three months to September 30: net income, $609,688, equal to $1.44 each on 421,981 shares of capital stock, against $764,266, or $1.81 a share on the stock, in the same period last year.

Baldwin Rubber Co., Pontiac, Mich. Nine months to September 30: net profit, $401,828, equal to $1.26 each on 316,757 shares of $1 par capital stocks outstanding, against $301,706 or $1.08 each on 278,604 shares a year earlier. The company is not liable for surtax on undistributed profits in the nine months period of this year as the result of distributions made to stockholders. Company's fiscal year has been changed to end September 30.

[1] Dividends Declared on page 90.

Barber Co., Inc., Philadelphia, Pa. Nine months to September 30: net profit, $629,649, equal to $1.61 each on 390,223 capital shares, against $218,605, or 56¢ a share last year. Net profit for the twelve months ended with September was $855,589, or $2.19 a share, compared with $199,565, or 51¢ a share in the preceding twelve-month period.

Boston Woven Hose & Rubber Co., Cambridge, Mass. Year ended August 31, 1937: net earnings, $434,992.51 which, after providing for dividends on 7,500 shares of preferred stock outstanding at the rate of $6 per share, is equivalent to $4.53 per share on the 86,000 shares of common stock outstanding, compared to $217,251.11 for the year ended August 31, 1936, equivalent to $2.00 per share. Net earnings were arrived at after charging $202,718.73 for depreciation on the plant and machinery and after providing for all accrued taxes and other charges. The deduction for federal, state, and local taxes, including undistributed profits tax of $5,689.35 and social security taxes, totalled $2.42 for each share of common stock. Product sales for the year increased $1,535,438.22, or 29.5%. The poundage shipped increased 6,282,311 pounds, or 26.5%.

Columbian Carbon Co., 41 E. 42nd St., New York, N. Y., and subsidiaries. Nine months ended September 30: net profit, before provision for federal surtax on undistributed profits, of $3,686,067, equal to $6.85 a share, compared with $2,654,104, or $4.94 a share, for the same period last year. Surplus as of September 30 was $6,147,962, against $5,045,143 on January 1, 1937.

Flintkote Co., 50 W. 50th St., New York, N. Y., and subsidiaries. Forty weeks ended October 9: net income, $1,091,991, equivalent to $1.63 a share on 668,746 shares of outstanding stock. The net income in the corresponding period of 1936 was $944,881, or $1.41 each on 668,046 shares then outstanding. Twelve weeks ended October 9: net income, $432,757, or 65¢ a share, against $473,482, or 71¢ a share, in the same weeks of 1936. Net income for the 52 weeks to October 9 was $1,318,144, or $1.97 a share, against $1,160,172, or $1.74 a share, in the 52 weeks to October 10, 1936.

Net sales for the forty-week period this year aggregated $12,418,165, against $10,720,728 a year earlier. Sales in the fifty-two weeks ended on October 9, last, increased to $15,373,695 from $13,241,705 in the corresponding previous period. For the twelve weeks ended on October 9 sales amounted to $4,204,955, against $3,953,946 in the twelve weeks ended on September 30, 1936.

Freeport Sulphur Co., 122 E. 42nd St., New York, N. Y. Nine months to September 30: Consolidated net income, $1,979,360, equal to $2.41 each on 796,380 common shares after preferred dividend requirements. These earnings compare with $1,510,511, or $1.82 a common share in the same period a year earlier. September quarter: net income, $699,518, or 85¢ a share, against $495,638, or 60¢ a share, in the three months ended September 30, 1936.

General Cable Corp., 420 Lexington Ave., New York, N. Y. September quarter: net profit after provision for contingencies and surtax on undistributed profits, $919,999, equal after quarterly dividend requirements on 150,000 shares of 7% cumulative preferred stock and after allowing for dividend requirements on Class A stock to 52¢ a share on 550,730 shares of no par common stock. This compared with net profit of $1,068,924, or 79¢ a share on 550,730 common shares, in the preceding quarter and revised net profit of $500,809, equal after preferred dividend requirements to 64¢ each on 368,353 shares of Class A stock, in the September quarter last year. Net profit for the year ended on September 30, $3,408,975, equal after preferred and Class A dividend requirements to $1.61 a share on common stock.

Monsanto Chemical Co., St. Louis, Mo., and subsidiaries. Nine months to September 30: net profit, after estimated surtax on undistributed income, subsidiary preferred dividends and minority interest, $3,999,758, equal, after dividends on new $4.50 preferred stock, to $3.55 each on 1,114,338 shares of capital stock. This compared with net profit of $3,229,367 before undistributed profits taxes, or $2.90 a share on 1,114,410 shares a year earlier. September quarter: net profit, after surtax, $1,224,499, equal to $1.06 a share on 1,114,338 capital shares, against $1,441,405 or $1.29 a share in the preceding quarter. In the third quarter last year net profit was $1,160,785 before surtax, equal to $1.04 each on 1,114,410 shares.

New Jersey Zinc Co., 160 Front St., New York, N. Y. Nine months ended September 30: net income, $6,523,928, equal to $3.32 a share on 1,963,264 shares of $25 par capital stock. The net income in the same period last year was $3,593,585, or $1.83 a share. Quarter ended September 30, 1937: net income $2,172,145 equal to $1.10 a share. The net income in the preceding quarter totaled $2,181,941, or $1.11 a share, and in the September quarter of 1936 amounted to $1,253,813, or 64¢ a share.

Raybestos-Manhattan, Inc., Passaic, N. J. Nine months ended September 30: net income, $2,064,035.11, or $3.25 per share, after providing for all charges, expenses, and taxes, and adding $150,000 to the reserve for contingencies for the surtax on undis-

(*Continued on page 70*)

Rubber Industry in Europe

GREAT BRITAIN

International Automobile Show

This year's automobile show was held at Earl's Court instead of at Olympia where previous exhibitions had been held regularly since 1904. Altogether 58 makes of cars were shown, not counting the exhibits of body builders.

Rubber is being used more and more in the construction of cars, and now more than 140 parts are made of this material. Both the new Austin model known as the Big Seven and the older Seven, which is continued, have engines with three-point rubber mountings. In another new Austin design, an Eighteen-Six, which replaces an earlier style, a feature of the transmission is that a coupling shaft with front universal joint rims runs back from the gear set to the open propeller shaft. The bearing of the rear end of the coupling shaft is mounted in rubber.

The engine of the Riley Big Four is mounted on rubber and has a rubber-loaded tie-rod system on the dashboard coupled to the rear end of the cylinder block.

The two new Humbers have engines with unusually flexible mountings. There are single live rubber supports at the front and double rubber supports at the rear. A unit consisting of the radiator block resting on a pressed steel unit with side extensions forming the front fender brackets has so-called monopoise mounting; this unit is supported centrally by a rubber pad resting on the front cross-member of the chassis, and with front fenders and front end of the hood, is thus insulated from chassis distortion.

Although some cars were seen with rubber underlay for the leather instead of fabric or hair, and there were a few more cars using Dunlopillo, rubber for automobile upholstery does not appear to have made a great deal of headway.

Builders Cement-Latex Compositions

In a paper on cement-latex compositions for flooring, read at the first meeting of the present session of the London and District Section of the Institution of the Rubber Industry, W. G. Wren presented results of the experimental work carried out at the Imperial Institute Kensington. It was found regarding physical properties that these could be widely modified by changing the mixtures by the addition of small quantities of suitable compounding ingredients or by varying the proportions of cement to rubber. Simple changes in composition resulted in products that might be almost as hard as concrete or soft as rubber. The mixtures have excellent mechanical properties, are attractive in appearance, and if light aluminous cement or "Snowcrete" is used, it is possible to obtain mixtures that lend themselves to very bright coloring; but even with ordinary aluminous cements, which do not take on very bright colors, interesting mosaic effects are possible. So far it has not been possible to obtain a perfectly polished surface, although some attractively finished commercial samples were produced.

The mixtures have the advantage of possessing very good non-skid properties which are retained to a high degree even when they are wet. They also have good heat- and sound-insulating properties and are practically non-inflammable. Various uses have already been found for these materials, and many others suggest themselves. They have been found valuable for covering ship decks, flooring cow stalls and piggeries, where they render straw unnecessary, for waterproofing walls in tube railways, for lining tanks, and as an adhesive. In the latter connection it is worth noting that while neither cement nor rubber will adhere to glass, mixtures of cement and latex do adhere very tenaciously to glass, thus opening up possibilities of wide use for facing concrete buildings with glass, a problem hitherto unsolved. Tests have also been made with mixtures for use in paving roadways, but here there are still several problems to be worked out.

Notes

The Cornmarket in Oxford was recently paved with Gaisman Bramble Blocks, traffic lines and stop notices being in colored blocks. Lombard St., London, is to be similarly paved, the costs to be partly borne by the Corporation of the City of London and partly by the frontagers, chiefly bankers.

The Lawn Tennis Ball Convention has decided on a price increase for tennis balls amounting to 1s. per dozen so that the new price to clubs will be 12s. a dozen and to the public 13s. a dozen.

An order was recently issued for the compulsory winding up of the Trowbridge Tire & Rubber Co. (1936) Ltd.

The North British Rubber Co. declared a dividend of 3s. per share less tax, on the 5% cumulative first preference shares, being arrears of dividends for three years to December 31, 1936. On March 31, last, arrears for 3½ years, to December 31, 1933, were paid.

Seamless rubber boots for cattle, intended for use in the treatment of foot disease, have recently been placed on the market by Dunlop Rubber Co., Ltd. Similar boots for sheep have been on the market for some time.

GERMANY

1936 Tire Statistics

Recent official figures indicate the effect that the motorization program of the government has had on tire production. The 1936 tire output came to 81,000 tons, about 6,000 tons above the 1935 figure. In 1936, 36% of the tires were for passenger and delivery cars, 27% were truck tires, and 25% cycle tires. Consumption of raw and reclaimed rubber by the tire industry totaled 48,000 tons, a 14% increase over the 1935 total. The value of tire exports was 27% above that in 1935. This trend continued through part of 1937, and although a decline occurred during the summer, the total tire exports at the end of the year are expected to show a further gain.

Hitherto 37 different types of passenger car tires were produced by local tire manufacturers. Recently at a conference with automobile manufacturers they decided to reduce the number of types to 10 and also to cut the number of types of truck tires. It appears that the new standards will be based chiefly on the 16-inch tire for passenger cars, 20-inch tires for light and medium trucks, and 22-inch tires for heavy trucks, as practical experience has indicated the greater usefulness of these sizes.

Curing Rubber Hose

In curing rubber hose, especially those with lead sheaths or fabric inserts, it is usually the custom to roll the hose filled with compressed air or suitable pressure fluid, on to drums which are then placed into the vulcanizer. Hose so treated always has a tendency to retain a certain curvature. Hydraulik G.m.b.H. Duisburg, recently patented a method[1] to prevent this defect. The hose is rolled on to a drum in the usual way, but is passed through the vulcanizer in extended condition and thus

[1] D.R.P. No. 650,955.

cured. An additional advantage of this method, it is claimed, is that it permits the use of smaller heaters whereby steam consumption is at the same time reduced.

Rubber Trade

Germany's crude rubber imports continue to mount rapidly and reached the record figure of 107,668 quintals in September, 1937, against 61,180 quintals in September, 1936. For the period January-September, 1937, the total was 729,300, against 518,291 quintals in the corresponding period last year. To these imports of raw rubber must be added the growing quantities of old tires to be used for reclaim which formed the bulk of the 149,472 quintals of rubber goods imported in the first nine months of 1937. In the same period of 1936 total imports of all manufactured rubber had been only 12,770 quintals.

Exports during September, 1937, at 13,592 quintals were practically the same as for September, 1936, but the total for January-September, 1937, was 144,265 against 117,100 quintals.

Achema IX

The next Achema, IX, will probably be held in 1940. The place has not yet been decided, but it is announced that there will again be a number of conferences and meetings, including that of the German Chemists. Another event scheduled for the same time in Germany is the Second International Chemical Engineering Congress which will form part of the World Power Conference.

Company Notes

The 100% crude rubber import duty introduced in Germany on May 13, 1937, is held partly responsible for the adverse balance of Zieger & Wiegand A.G., Leipzig. Accounts for 1936-1937 closed with a loss of 15,877 marks. The loss the previous year was 49,019 marks.

The Hackethal Draht-und Kabel Werke A.G., Hannover, reported increased business both at home and abroad in 1936. Because of the increased prices for raw materials the firm resorted more and more to locally produced substitutes. It declared a 6½% dividend.

EUROPEAN NOTES

The establishment of a new rubber factory is reported in Mikulas, Czechoslovakia. This concern, to be known as Gumarske Podniky Darina, is said to be capitalized at 1,000,000 Czech kronen.

Czechoslovakia's rubber industry is making considerable headway, judging from recent statistics. During the first half of 1937 crude rubber imports jumped to 80,360 quintals from 37,690 quintals in the same period of 1936. Although imports of rubber manufactures rose from a value of 14,006,000 Czech kronen to 19,119,000 Kc., exports of manufactured goods showed a still greater increase, 49,158,000 Kc. against 30,803,000 Kc. Of the imported goods increases appear for thread, all kinds of tires, mechanical goods, and rubber-soled canvas shoes. However these increases were unimportant, when compared with the gains in the exports of most of the following items. Footwear exports, for instance, mounted from 2,806,611 pairs, value 19,018,000 Kc., to 4,053,789 pairs, value 30,602,000 Kc.; cycle tires came to 25,826 units, value 212,000 Kc., against 13,776 units, value 116,000 Kc.; automobile tubes, 20,936 units, value 419,000 Kc., against 11,179 units, value 184,000 Kc.; automobile tires, 21,373 units, value 4,455,000 Kc., against 9,112 units, value 1,387,000 Kc. Cycle tubes, however, declined from 24,847 units, value 89,000 Kc., to 16,818 units, value 65,000 Kc.

The Tenth International Congress for Chemistry is to be held in Rome, Italy, from May 15 to 21, 1938.

The Government of Albania recently decided to place import restrictions on a number of specified products from countries other than United States, Italy, and Greece. Among these goods are rubber tires, tubes, shoes, accessories for bicycles and motorcycles, etc.

Available figures for Finland's rubber trade in 1936 give imports of crude rubber, gutta percha, and balata amounting to 1,635 tons, in addition to 160 tons of old and reclaimed rubber. Imports of belting, hose, and packing totaled 209 tons; automobile tires, 567 tons; footwear 37 tons; surgical goods, 2 tons; other rubber goods, 71 tons. Listed among the exports are 215 tons of footwear, 16 tons of belting, and 94 tons of other rubber goods.

A slight recession occurred in the consumption of rubber in France this year, figures for 12 months ended August, 1937, having been 63,807.6 metric tons, against 65,955 tons in the corresponding period of 1936.

The automobile show recently held in Paris, France, boasted many interesting exhibits. Streamline principles for cars prevailed, but mostly in moderation. Renault was introduced at the show as a maker also of automobile tires. The firm has imported necessary machinery, and a plant already is operating at Billancourt. It is planned eventually to equip all the company's cars with Renault tires. The reason for this move is that the company policy is to avoid being dependent on any one firm for any particular part. When Michelin secured control of the Citroen company, Renault ruled out Michelin as a source of supply. That action left only one other large tire manufacturer, Dunlop. Thus Louis Renault decided on his own tire making plant. French tire manufacturers were skeptical notwithstanding the fact that Renault had a nucleus in a company making all the tires for his taxicab fleets.

FINANCIAL

(*Continued from page 68*)

tributed profits, etc. In the same period of 1936, net income was $1,461,525.87, or $2.30 per share, before providing for the surtax.

Pharis Tire & Rubber Co., Newark, O. Nine months ended September 30: net loss, $135,307, after provision of $250,000 for commitment losses and reduction of inventories to their market value.

United Carbon Co., Charleston, W. Va., and subsidiaries. Nine months to September 30: net profit, $1,917,108, equal to $4.82 a share on 397,885 common shares, against $1,574,965, or $3.96 a share, last year. September quarter: net profit, $551,740, equal to $1.39 a share, against $643,000, or $1.62 a share, in the preceding quarter and $487,358, or $1.22 a share, in the third quarter of 1936.

U. S. Guayule Imports Up

United States imports of guayule rubber, a variety produced from uncultivated shrubs in Mexico, totaled 2,053 long tons in the first nine months of 1937, against only 821 tons in the same period of 1936. In each of the three months July, August, and September imports of guayule rubber amounted to over 300 tons, and at this rate the total for the year should be more than 3,000 tons. This figure exceeds any other annual total since 1928.

Guayule rubber, like other than standard varieties, is not produced in large quantities at times of extremely low prices. During the period November, 1930 to February, 1934, the United States imported no guayule rubber, and the Mexican extraction mills were not operating. But in 1927 imports into this country exceeded 5,000 tons, and in 1911 they were over 7,000 tons. The two years last named were in times of high rubber prices. *Commerce Reports.*

Rubber Cutting Block

In press cutting aluminum alloy panels and louvers for airplane fuselages expensive hand filing to finish off burrs left on the edges has been eliminated by a rubber cutting block recently developed by the Goodyear Tire & Rubber Co., Inc. Experimentation revealed that a rubber slab 168 inches long, 50 inches wide, and nine inches thick gave greater satisfaction than any other material used to inlay the press head. In order to maintain consistent hardness Goodyear found it advisable to build up the slab in nine one-inch laminations. The slab, attached to the presshead by cemented rubber plugs, is reversible so that a second surface is available after the dies have gradually cut and gouged the first.

Rubber Industry in Far East

NETHERLAND INDIA

Condition of Planting Industries

The planting industries in Netherland India were discussed by Jhr. W. J. de Jonge at the combined meeting of the Federated Associations of Netherlands Indian Hill Estates and the affiliated Producers Association, held in Amsterdam on October 20. Mr. de Jonge stated that the impression had been gained in certain circles that in the preceding 20 months Netherland Indian producers had completely recovered from the effects of the slump, and his object was to outline broadly the main features of the period to establish what it had actually brought the planting industries.

Referring particularly to rubber, he pointed out that the gratifying increase in the price was being offset by rising costs and the limits on the possible margin of profits imposed by crop restriction and the price policy of the I.R.R.C. On the other hand, high prices stimulated the use of reclaim and the production of synthetic rubber; while there was besides the weak spot in consumption that most of the rubber goes into tire production which depends on the automobile industry, which again is so easily influenced by business conditions. He showed how the use of reclaim in the United States had increased very definitely during the first eight months of 1937 over the same period in 1936 and also stressed that producers could not be warned often enough of the threatening competition from synthetic rubber.

In judging the condition of companies, it should also be considered that they must now make use of their increased funds to improve their estates, to make up for past neglect. Recent reports from experiment stations indicated that this work is in fact being done, and much more activity is being shown in replanting, manuring cultivation, and especially in disease prevention, as planters are realizing the importance of giving their costlier budded areas more care and of keeping the whole productive area in the healthiest state possible. In the factories equipment has become obsolete and must be replaced. During the slump concerns not only had to fall back on their reserves, often depleting them completely, but also had to borrow considerable sums of money to carry on.

To make good all this, said Mr. de Jonge, will cost much more than the 20 months of prosperity have yielded. He gives authoritative figures to illustrate what producers in general (not only rubber companies) have gone through financially. In the period 1930-1935, the concerns suffered a total loss of 630,000,000 guilders. While their average yearly profit had come to 480,000,000 in the years 1924-1929, the profit for the entire 20-month period had amounted to only 420,000,000 guilders.

Mr. de Jonge's conclusion was that for certain planting industries, including rubber, a period commenced some time ago which offered them the opportunity of recovering from the losses of the past, and to arm themselves for a future which at the present appeared wholly uncertain.

Notes

Goodyear Tire & Rubber Co., Akron, O., U. S. A., has been considering further expanding its factory at Buitenzorg, Java, particularly with the view to increased export business. It appears that this factory has already developed into one of the most profitable of the company's foreign enterprises. Exports to neighboring countries are steadily increasing, and but for the Japanese-Chinese conflict Goodyear would have opened a sales branch in China.

Since October the Outer Provinces have been preparing export licenses for native rubber for the first quarter of 1938, based on the present permissible exportable of 90%. There are about 800,000 native producers, most of them in remote districts where postal communication is poor, and as it takes about six weeks to make out the necessary licenses, those for the first quarter of 1938 had to be prepared early in order to be sent out in December. Consequently it was not possible first to await the decision of the I.R.R.C. on the export percentage. However, should the committee lower the percentage of permissible exports, the difference will be adjusted in 1938.

August Exports

Final figures for rubber exports from Netherland India in August, 1937, as issued by the Central Bureau of Statistics, indicate that Java and Madura shipped a total of 6,899,841 kilos of rubber, dry weight, including 5,348 kilos of latex. In addition 4,675 kilos were shipped in the form of tires. Estates in the Outer Provinces sent 12,180,749 kilos of rubber, dry weight, including 1,134,677 kilos of latex. Native exports from the Outer Provinces came to 22,411,632 kilos dry weight. Thus exports totaled 41,496,897 kilos dry weight.

MALAYA

No F.O.B. Contracts to Japan

Rubber exporters at Singapore are reported to be refusing to make f.o.b. contracts to Japan. This attitude seems to be due to the measures restricting imports, (rubber among them) which the Japanese government has been forced to take in order to maintain a certain equilibrium of the trade balance and to prevent a further drop in the value of the yen.

Rubber Remilling Down

The 1936 report of the Rubber Controller indicates the rubber remilling business in Singapore and Penang is apparently dying out. This condition, it is stated, is partly due to the fact that remillers are moving to the mainland to be nearer the sources of uncouponed rubber which they require to make up the difference between the gross weight and the dry weight after remilling. In part the condition is also due to the much smaller percentage of low-grade rubber in the total imports into Singapore and Penang. The main source of wet rubber has been Netherland India, but there has been a steady decrease in the proportion of wet rubber from that center. Thus whereas in 1934 the amount of wet rubber reaching Malaya from there was 124,000 tons out of a total 164,000 tons, this fell to 54,000 tons out of a total 116,000 tons in 1935 and to 23,000 out of 101,000 tons in 1936.

Smoke houses are still doing fairly well; their business is largely smoking sheet from Netherland India.

Lower Quota Urged

The continued drop in the price of rubber is arousing much discussion on the question of lowering the quota in 1938. It is pointed out that next year the total standard production of all restricting countries will automatically be raised from 1,298,500 to 1,335,250 tons, an increase of 36,750 tons. Malaya's standard will be increased to 602,000 tons, and with 90% release her monthly exportable would be 45,150 against 36,812 tons in the first quarter of this year, 39,267 tons in the second quarter, and 44,175 tons in the last half of this year. It is hoped that the I.R.R.C. will be as prompt to assist producers by suitable action as it was to protect consumers when earlier this year prices were mounting to what was claimed to be an unfair level.

Self-Sown Rubber Out

An amendment to the Rubber Regulation Enactment, 1936, was recently introduced giving power to the Rubber Controller to eradicate and destroy rubber plants which are self-sown. According to one of the clauses: "Any rubber plant which has developed and grown from seed has germinated without having been intentionally planted shall nevertheless be deemed to have been planted in contravention of Section 19 of the Rubber Regulation Enactment, 1936."

Planters' Conference

The thirteenth annual conference of the Incorporated Society of Planters, held at Kuala Lumpur from September 17-19, 1937, was attended by a large gathering of planters and others interested in the industry. Among the papers read were "Nonsense, Common Sense and Statistics in Field Experiments with Rubber Trees," by H. J. Page, director of the Rubber Research Institute of Malaya; "Experiments on Tapping Systems," by C. C. T. Sharp, of the Botanical Division of the Institute; and "Recent Pages from a Scientist's Notes on Rubber Cultivation," by W. B. Haines, of Dunlop Plantations, Ltd.

JAPAN

Synthetic Rubber

While Japanese have for some time been working on synthetic rubber, it does not appear that they have as yet produced an article equal to Neoprene or Buna. In fact it seems safe to say that work in this direction has so far not progressed to any extent, if at all, beyond the experimental stage. However a good many different concerns are concentrating on this problem, and success is therefore looked for.

The Sumitomo Electric Wire Co., Ltd., has been attempting to make synthetic rubber for covering cables and other wires. Experimental production reached an average of 5 to 10 kilos a day, and latest reports state that this figure is to be increased to 50 kilos a day. The synthetic material then produced is to be mixed with natural rubber and used for covering wires and cables.

The Umeno Kenkyusho, Osaka, was reported to have opened one of the first experimental workshops for synthetic rubber in September; while the Japan Automobile & Airplane Tire Co. has also been installing a laboratory for the manufacture of synthetic rubber and plans to carry out investigations and experiments on the largest scale attempted in the country.

Company Activities

The Naniwa Rubber Industrial Co., Osaka, is said to have started producing latex yarn, chiefly for export.

The Takawago Rubber Industrial Co., which formerly manufactured belting exclusively, is to build a new plant in Kawasaki, where it will produce chiefly automobile tires and tubes.

Japanese interests have taken over the Ta Li Rubber Co., Mukden. The concern is to be reorganized under the name of Fukusuke Rubber Co., with a capital of 6,000,000 yen,[1] and will manufacture rubber soled shoes, tires, and belting.

The Yamamoto Rubber Co. plans to specialize in the manufacture of rubberized cloth in its third plant recently erected at Katsushikaku, Tokyo. The company's output of such cloth is thereby expected to be increased by 60%.

The inaugural meeting of the newly organized Showa Industrial Co., a subsidiary of the Meiji Sugar Mfg. Co., took place on June 1. The concern absorbed the four affiliated firms, the Nan-a-koshi, the Sumatra Development Co., the Tokyo Rubber Industry Co., and the Meiji Rubber Industry Co., whereby its capital of 3,000,000 yen is increased to 10,000,000 yen. This fusion makes the concern the most important Japanese company in the rubber plantation business and at the same time a power in the local rubber manufacturing industry. It is reported to be planning the erection of a new plant with modern equipment on the site of the former Tokyo Rubber Industry Co., where it will specialize in latex waterproof cloth, a product recently developed by the former Meiji Rubber Industry Co. Other latex products will probably also be added.

[1] Yen=$0.2912 U. S. currency (Nov. 22).

Imports and Exports

In the beginning of 1937 the Department of Commerce and Industry decided to limit imports of certain raw materials, including rubber, and fixed the quota for rubber for the current year at 72,000 metric tons. This figure was arrived at by adding 10% to the average imports during the five years ending 1936. This action had the effect of spurring consumers to rush purchases in the first half of 1937 and totals over this period came to the exceptionally high figure of 44,979 metric tons, which compares with about 29,000 tons in the first half of 1936, 31,250 tons in the first half of 1935, and 34,200 tons in the first half of 1934. These imports include gutta percha.

There was also a notable increase in scrap rubber imports.

Exports of rubber manufactures in the first half of 1937 increased considerably as compared with the first half of the preceding year, the figures having been 27,824,046 against 20,572,752 yen. The rise was partly due to the inclusion of new items, partly to higher prices, but also to actual volume increase, and almost all items participated. Despite protective measures in various countries, Japan succeeded in increasing exports of all kinds of footwear from 9,452,682 yen in the first half of 1936 to 12,685,664 yen in the first half of 1937. There was a decrease in the volume of cycle tires, but an increase in value; but automobile tires and tubes and all other tires and tubes showed increases both in volume and value. The total value of exports of all kinds of tires and tubes was 6,246,905 yen against 4,875,394 yen.

A substantial increase also occurred in exports of belting, from a value of 948,478 yen in 1936 to 1,438,422 yen in 1937.

Among the new items, specially mentioned are raincoats, which amounted to 825,266 yen in 1937, and water bottles, at 180,193 yen. Exports of rubber bands and threads spurted from 480,331 to 992,510 yen. Exports of baseballs rose from 3,170 dozen, value 9,094 yen, to 27,988 dozen, value 46,929 yen.

More Rubber Goods Made by Rubber Countries

Recent statistics show that the output of rubber goods manufactured in Brazil, British India, British Malaya, and Netherland India increased 56% in the first seven months of 1937 as compared with the same period of 1936. These territories together produced about 81% of the world's requirements of crude rubber. All four countries make footwear and sundry rubber goods; while Brazil, British India, and Netherland India also manufacture automobile tires.

At present British India leads in the domestic absorption of rubber, the total for 1936 having been 5,967 tons. This figure is likely to be doubled in 1937 as the absorption for the first seven months of the current year comes to 4,677 tons, an 85% increase over the corresponding period of 1936. Progress is considerably slower in Brazil, whose 1937 absorption of 1,485 tons shows an increase of 5% over the 1936 period. But Netherland India, shooting rapidly ahead, used 1,118 tons in the first seven months of 1937, a 61% increase; while British Malaya's absorption of 326 tons showed an increase of 46%.

Black Dielectric Enamel

A black enamel with special dielectric properties dries to a rubber finish, although it contains no rubber. The "rubber finish" refers to the sheen and color obtained. The enamel produces a tough, durable coating which has high electrical resistance, and it is suitable for finishing electrical apparatus such as steel switchboards, instrument panels, coils, and radio bases. When the finish becomes marred it can readily be renewed without dismantling the equipment, by spraying on another coat of enamel. A surfacer, with similar electrical properties is also available for preparing the metal surface for enameling.

Editor's Book Table

BOOK REVIEWS

"Rubber Red Book." This Directory of the Rubber Industry includes a Bibliography of Rubber Literature for 1936 compiled by D. E. Cable. Published by *The Rubber Age*, 250 W. 57th St., New York, N. Y. 6 by 8¾ inches, 370 pages. Price, paper bound, $2; cloth bound, $3.

This book extends the scope of the rubber chemicals directory published last year for the first time as an addition to the "Annual Bibliography of Rubber Literature—1935" and includes reference data on many other phases of the rubber industry. Thus, in addition to the rubber bibliography for 1936, the 1937 edition contains lists of rubber manufacturers in the United States and Canada; rubber machinery and equipment and their manufacturers; rubber chemicals and compounding materials and their suppliers; reclaimers; crude and scrap rubber dealers; miscellaneous types of rubber; miscellaneous products; etc. A section on latex which includes an article by R. J. Noble, contains information on suppliers for the latex industry.

The book contains a considerable amount of useful data for all those connected with the rubber industry. Through careful arrangement and adequate cross references the data are in a form that lends itself to ready accessibility.

"Labor's Road to Plenty." Allen W. Rucker. L. C. Page & Co., Boston, Mass. 1937. Cloth, 5¾ by 8½ inches, 221 pages. Index. Price $2.50.

The appearance of this book is timely in view of the interest shown in the current wage-and-hour bill before Congress. This book is based on a study of the effects of regimentation in industry and arbitrary price, wage, and hour regulation which have been under way in the United States for the past 15 years. Through statistical data in the form of charts and tables the author shows the comparative results of regulation and non-regulation in industry. Average yearly incomes, average output per worker, wage-rates, and profits are shown as reported by official federal agencies.

After pointing out the dangers of pursuing a policy of wage regulation, the author recommends a return to the "American system of productivity." Based on consistent previous results in the face of attempted regulation, the author proposes a constructive wage relation wherein payrolls would be a definite percentage of the value added by manufacture.

Tables on pages 39 and 44 include statistics on the rubber industry in comparison with other industries. One table gives the per cent of profitable corporations to total active ones in the years, 1923, 1929, and 1933; while the other shows the relation of profit probability and employment opportunity.

"Chemical Engineering Catalog." Twenty-second Annual Edition, 1937. Published by Reinhold Publishing Corp., 330 W. 42nd St., New York, N. Y. Cloth, 1,034 pages, 8 by 11 inches. Illustrated. Index.

The latest edition of this standard reference work for the process industries contains information regarding the products of several hundred concerns manufacturing engineering equipment and supplies for chemical and related industries including rubber. The volume consists of the following sections: Company Index; Trade Name Index; Equipment and Supplies, Classified Index and Manufacturers' Catalogs; Chemicals and Raw Materials, Classified Index of Industrial, Laboratory, and Reagent Chemicals, and Manufacturers' Catalogs; and Technical and Scientific Books.

"Chlorkautschuk und die ubrigen Halogenverbindungen des Kautschuks." Dr. Andreas Nielsen. Published by S. Hirzel, Leipzig, Germany, 1937. Paper, 123 pages, 6 by 8¼ inches.

For almost ten years Dr. Nielsen has been working on chlorinated rubber and other halogen derivatives of rubber, and the present book gives the results of his experiences in this field both in the laboratory and in the first large-scale factory for chlorinated rubber established in Tornesch. After briefly touching on rubber as a raw material, the earlier experiments with halogen, and the chemical structure of rubber, the author goes into details of the production, properties, and uses of chlorinated rubber. About 30 ways in which chlorinated rubber can be used in the manufacture of both oil-free and oil varnishes and finishes are mentioned, besides its employment in the manufacture of such varied products as threads, films, artificial leather, insulation material, proofed fabrics, adhesives, floor covering, safety glass, road-building material, etc. A review of the industrial development in Germany and America as well as of the cost of production and prices concludes this section.

The succeeding chapters are devoted to a summary of the production, properties, and uses of such halogen derivatives as rubber hydrochloride, brominated rubber, iodized rubber, fluorinated rubber, etc. The author states that the most important of these, rubber hydrochloride, presents some similarities to, but also several characteristics different from chlorinated rubber. It appears to yield stronger films, but its stability can be rendered equal to that of the latter, and the cost of production is stated to be lower. The book closes with useful indices and a list of German and other patents.

"Kunstoff-Wegweiser, 1937." Dr. G. Kranzlein and Dr. R. Lepsius. Issued by the Plastics Exhibition 1937 at the Achema VIII. Publisher, Verlag Chemie, Berlin, Germany. 140 pages, 8vo. Price, R.M.1.50.

Originally intended as a guide for visitors to the Plastics Exhibition held in connection with the Achema VIII, this little book has become useful as a reference. It not only explains the purposes and aims of the various groups and the exhibits, but also gives useful information regarding the various types of synthetics, their properties and uses, testing methods and the machinery required for their production. The section dealing with artificial masses used instead of rubber and gutta percha will be found especially interesting in rubber circles. This portion is amplified by tables showing the different types of synthetics used instead of soft rubber, hard rubber, latex, and solutions. This informative little booklet, which has an attractive cover of cellulose acetate in sheet form named Pelloro, closes with a long list of German synthetic products arranged in alphabetical order, with their composition, use and manufacturer briefly indicated.

"Monsanto Current Events." Monsanto Chemical Co., St. Louis, Mo. 40 pages. The October-November issue of this house-organ contains an article on the new latex balloons made by the Kaysam process. The discussion covers the application of these balloons as used for stratosphere flights, meteorological purposes, aerial photography, and cosmic ray study. Another article describes the plant of Monsanto's 70-year-old British subsidiary at Ruabon in North Wales. Also included in this issue are articles on "Chemistry—Giver of Freedom," "Phenol," and "Robert Wilhelm Bunsen—Soldier of Science, Master Investigator." Interplant news items and personal photographs of employes at work and play cover seventeen pages of this company house-organ.

NEW PUBLICATIONS

"News about du Pont Rubber Chemicals." E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. A news letter, dated November 5, 1937, contained seven enclosures, five of which were reports:

(1) "Hot Water Bottles and Syringe Bags." H. G. Bimmerman. Seven pages. Three compounds which utilize combinations of Zenite A and Antox are given for hot water bottles. The essential difference in the three stocks is the degree of loading, and physical test data show the effect of this difference. In addition, base compounds for syringe tubing and kitchen sink mats are included. The report contains recommendations for coloring stocks of this type based on the recent standardization of colors by the National Bureau of Standards. In conclusion two shellac formulas for finishing the surfaces of hot water bottles are given.

(2) "Latex Compounding." Six pages. Part 1 of this report discusses briefly the relative merits of water soluble and water insoluble accelerators for latex. A series of compounds using various combinations of soluble and insoluble accelerators are given with physical test data. In Part 2 a series of latex compounds which contain no zinc oxide are listed. These compounds are recommended for transparent products, such as balloons and, as the compounds do not contain free zinc oxide, they are claimed to possess a high degree of stability.

(3) "The Use of Rubber Peptizing Agents for Making Liquid and Viscous Rubbers." Two pages. Two methods using RPA No. 1 are suggested for making rubber that will flow at room temperature and pour readily when heated to temperatures of from 70° to 90° C. Both methods require milling, heating, and solvent treatment. For making rubber that is very soft and plastic at room temperature and viscous when heated to temperatures of from 80° to 90° C., two methods are recommended which utilize RPA No. 2. In one method milling, heating, and solvent treatment are required; while in the other method prolonged mastication in a heated internal mixer is the only processing requirement.

(4) "Neoprene-Channel Black Masterbatches." One page. A masterbatch of reasonable stability is shown to contain: Neoprene Type E, 100 parts; channel black, 50 parts; and cottonseed oil, 10 parts. In a previous report issued in August it was stated that masterbatches of Neoprene and channel black were not stable except when the proportion of black was so low as to make the masterbatch impractical.

(5) "Compression Characteristics of a Neoprene Stock and a Similar Rubber Stock." Felix L. Yerzley. Four pages. This report gives an interesting comparison of compression characteristics of a Neoprene stock and a similar rubber stock as determined on the compression oscillograph.[1] The report is concluded with a discussion of the relative merits of Neoprene and rubber when used for mechanical mountings.

(6) "Extrusion Qualities of Rubber." A. H. Nellen. Ten pages. This enclosure is a reprint of an article appearing in INDIA RUBBER WORLD, October 1, 1937, and discusses the effect of temperature, mill roll opening, and the use of naphthyl-beta-mercaptan on the extrusion qualities of rubber.

(7) "135 Years of Progressive Achievement." Eight pages. This enclosure briefly summarizes the du Pont company's principal lines of development in a wide variety of industries.

[1] Described in *Ind. Eng. Chem. (Anal. Ed.)*, Aug. 15, 1937.

"The Peril of Wage and Hour Legislation." Booklet-Editorial No. 24 by Allen W. Rucker in collaboration with N. W. Pickering, president of Farrel-Birmingham Co., Inc., Ansonia, Conn. 16 pages. This booklet discusses the deflationary effects of the Black-Connery Bill and urges the study of four aspects of labor's compensation: the differential hourly wage rate, the annual dollar income, the purchasing power of the annual income, and labor's percentage share of industrial income. Data are presented showing the purchasing power of annual incomes, the relation between hourly wage rates and annual wage incomes from 1929 to the present, and the relation between value added per worker by manufacture (sales less the cost of materials) and annual wage per worker during the period 1899 to 1935. From the latter, the authors show that "labor's share of industrial income tends to be uniform and almost constant, regardless of what industry, labor, or government does."

According to the authors, "In its attempt to put a floor under wage rate, the Black-Connery Bill can succeed only in bringing down the ceiling of annual incomes and labor's yearly purchasing power" and "the misuse of the differential hourly wage rate is easily the greatest tragedy of modern times. That device, useful to society in rewarding individual merit and skill according to its relative worth, has never been and cannot be used to lift the total income of all labor."

"The Vanderbilt News." R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y. 44 pages. The November-December, 1937, issue of this periodical is on latex compounding and has been written because of the demand for a previous issue on the same subject, the supply of which is exhausted. The present issue brings the subject material more nearly up-to-date.

After dealing somewhat briefly with the fundamentals of latex, the following subjects are discussed: accelerators, antioxidants, effect of Telloy, protective effect of Age-Rite White against copper and a copper salt, Darvan dispersing agents, how to make water dispersions of compounding ingredients, pebble mills, vulcanizing dispersions, effects of loading, and latex processing problems. The text material throughout is supplemented by latex formulas and physical test data.

"How Modern Shoes Are Made." United Shoe Machinery Corp., Boston, Mass. 67 pages. This informative booklet presents brief descriptions of the various leather shoemaking methods now in use. Each description is followed by an illustrated summary of the progressive steps in the construction of shoes by that method. The introduction, describing the history of shoemaking, is followed by a chapter on manufacturing procedure and shoe process classifications. Subsequent chapters discuss the various types of shoes and the method of their construction.

The Goodyear Welt Sewing Machine which was invented by a New York mechanic, introduced by Charles Goodyear and perfected under the management of Charles Goodyear, Jr., provided a means for producing the well-known welt construction. According to this booklet, this method of construction is still looked upon as the premier method of shoemaking and has always been associated with footwear of the best type.

"Bristol's Modern Potentiometer Pyrometer Recorders and Controllers." The Bristol Co., Waterbury, Conn. This catalog, listed as Bulletin No. 493, briefly describes Bristol's pyrometer recorders and controllers. The special features of the Pyromaster, a newly developed potentiometer, are outlined together with its uses as a pyrometer, a resistance thermometer, a tachometer, and a millivoltmeter. Another recent development in potentiometer pyrometer design which is used in Bristol's Wide Strip recorders and controllers is briefly described in this publication.

"Report on a Visit to Malaya, Java, and Sumatra." R. K. S. Murray. Bulletin No. 54, Rubber Research Scheme (Ceylon), Dartonfield, Agalawatta. May, 1937. 46 pages. Illustrations and tables. This report is based on a visit to Malaya and the Netherland India by the botanist and mycologist of the Rubber Research Scheme (Ceylon) whose object was to acquire information regarding the yields of budgrafted rubber in commercial practice. In addition, the general agricultural conditions and practices on rubber estates were studied in the three countries visited. The report is divided into four

(*Continued on page* 88)

Patents and Trade Marks

MACHINERY

United States

2,096,338. **Apparatus for Blowing Sponge Rubber.** C. J. Randall, Naugatuck, Conn., assignor to United States Rubber Co., New York, N. Y.

2,096,362. **Rubber Extruder.** P. W. Lehman, Grosse Pointe Park, assignor to United States Rubber Products, Inc., Detroit, both in Mich.

2,096,540. **Tire Deflation Signal.** E. Giroux, Jamestown, N. D.

2,097,811. **Tire Groover.** W. Foley, Los Angeles, Calif.

2,098,395. **Apparatus to Mold Hollow Rubber Articles.** J. A. Law, Kensington, Victoria, Australia.

2,098,418. **Apparatus to Equalize Thread Tension.** R. S. Francis, Rumford, R. I., assignor to United States Rubber Products, Inc., New York, N. Y.

2,098,422. **Constant Tension Control for Elastic Filaments.** A. W. Keen, Passaic, N. J., and F. D. Chittenden, Providence, R. I., assignors to United States Rubber Products, Inc., New York, N. Y.

2,098,688. **Tire Mold.** R. M. Lanyon, Los Angeles, Calif.

2,099,033. **Rubber Shoe Trimmer.** H. R. Polleys, New Haven, Conn., assignor to United States Rubber Products, New York, N. Y.

2,099,458. **Tire Tread Remover.** W. C. Althen, Columbus, O.

2,099,642. **Tire Deflator.** C. A. Overturf, assignor to American Tire Guard Co., both of Detroit, Mich.

Germany

650,870. **Tire Pressure Gage.** W. Kohne, Hamburg.

650,956. **Belt Vulcanizer.** G. Roese, Osnabruck.

650,957. **Device to Handle Profile Rings in Vulcanizing Molds.** K. Zangl, Munich.

651,174. **Glove Dipping Mold.** Veritas Gummiwerke A.G., Berlin.

651,485. **Tire Building Machine.** Deutsche Dunlop Gummi-Co., A.G., Hanau a.M.

651,628. **Hose Cutter.** Deutsche Dunlop Gummi-Co., A.G., Hanau a.M.

651,693. **Thread Making Device.** Societa Italiana Pirelli and U. Pestalozza, both of Milan, Italy. Represented by A. Bursch, Berlin.

651,882. **Safety Device for Rubber Couplings.** Humboldt-Deutzmotoren A.G., Koln-Deutz.

652,060. **Tread Groover.** Tecalemnit S.A., Paris, France. Represented by L. A. Nenninger, Berlin-Schoneberg.

United Kingdom

468,129. **Device to Roll Rubber Coagulum.** C. K. Morrison.

468,502. **Dipping Form.** A. N. Spanel.

468,584. **Apparatus to Make Joints for Rubber Rings.** E. Gluck.

468,852. **Vulcanizers.** D. Bridge & Co., Ltd., (National Rubber Machinery Co.).

468,935. **Coagulating Tanks.** F. B. Hardcastle and L. T. Wakeford.

469,213. **Electric Cable Extruder.** United States Rubber Products, Inc.

469,216. **Apparatus for Attaching Valve Stems.** Consolidated Rubber Manufacturers, Ltd.

469,228. **Rubber Rolling Mills.** Dunlop Rubber Co., Ltd.

469,238. **Device to Mold Wheel Tires.** H. Simon, Ltd.

469,331. **Battery Box Molding Press.** General Electric Co. and A. E. Phipps.

469,403. **Valve Components.** Avon India Rubber Co., Ltd., and K. B. Kilborn.

469,540. **Apparatus to Make Nipples.** S. Percival, (Cilcoon Corp.).

469,546. **Tire Mold Sandblaster.** Dunlop Rubber Co., Ltd., and H. Willshaw.

469,734. **Boot Making Apparatus.** F. W. and C. J. Farr and M. L. V. B. Lamer.

PROCESS

United States

2,096,296. **Slippery Rubber Goods.** J. Fromm, Berlin-Schlachtensee, Germany.

2,096,336. **Ebonite Powder.** F. N. Pickett, London, England.

2,096,609. **Coagulating Rubber Latices.** F. K. Daniel, London, England, assignor of 51/100 to A. C. Horn Co., Long Island City, and 24/100 to F. G. Breyer, New York, both in N. Y.

2,096,753. **Showerproof Fabrics.** E. A. Murphy and E. W. Madge, Birmingham, assignors to Dunlop Rubber Co., Ltd., London, all in England.

2,096,933. **Microporous Rubber Compositions.** W. J. Burgess, Palmyra, N. J., assignor to Electric Storage Battery Co., Philadelphia, Pa.

2,097,416. **Latex Coagulation.** S. B. Neiley, Winchester, assignor to Dewey & Almy Chemical Co., N. Cambridge, both in Mass.

2,097,481. **Rubber.** L. Wallerstein, New York, N. Y.

2,097,528. **Rubber Articles.** H. A. Morton, assignor to American Anode, Inc., both of Akron, O.

2,098,037. **Tire.** E. Hazell, New York, and S. R. Ogilby, W. New Brighton, assignors to United States Rubber Products, Inc., New York, all in N. Y.

2,098,222. **Bonding Material.** P. S. Barnhart, Westfield, assignor to Westfield River Paper Co., Russell, both in Mass.

2,098,258. **Adhesively Secured Seamed Structures.** W. W. Rowe, Cincinnati, assignor to Paper Service Co., Lockland, both in O.

2,098,354. **Footwear.** F. F. Olson, Belmont, assignor to Hood Rubber Co., Inc., Watertown, both in Mass.

2,098,365. **Porous Halogen Containing Rubber Derivatives.** H. A. Winkelmann, Chicago, and W. C. Calvert, Oak Park, both in Ill., assignors to Marbon Corp., a corporation of Del.

2,098,385. **Reclaiming Method.** F. W. Hall, Nutley, and N. R. Wilson, Belleville, both in N. J., assignors, by mesne assignments, to Stamford Rubber Supply Co., Stamford, Conn.

2,098,754. **Auto Top Material.** M. N. Nickowitz, Bridgeport, Conn., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,099,058. **Inflatable Article.** R. R. Frissell, assignor to Barr Rubber Products Co., both of Sandusky, O.

2,099,318. **Rubber Conversion Products.** L. B. Sebrell, Silver Lake, O., assignor to Wingfoot Corp., Wilmington, Del.

2,099,514. **Inner Tubes.** B. C. Eberhard, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

2,099,546. **Treating Rubber.** H. R. Thies, Stow, and G. R. Lyon, Akron, both in O., assignors to Wingfoot Corp., Wilmington, Del.

Dominion of Canada

369,371. **Showerproof Fabric.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of E. A. Murphy and E. W. Madge, co-inventors, both of Birmingham, England.

369,466. **Molded Mats.** Boston Woven Hose & Rubber Co., Cambridge, assignee of J. M. Bierer, Waban, both in Mass., U. S. A.

369,486. **Rubber Compound.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of J. D. Morron, Detroit, Mich., U. S. A.

369,692. **Reclaiming Rubber.** W. G. Essex, Southport, England.

369,716. **Rubber Product.** T. L. Shepherd, London, England.

369,769. **Rubber Tread Wheel.** H. T. Auerbach, assignee of E. J. Schmidt, both of Chicago, Ill., U. S. A.

United Kingdom

468,269. **Wheel Rims.** Dunlop Rubber Co., Ltd., G. E. Sharp, and G. H. Whale.

468,278. **Securing Ends in Drums.** Dewey & Almy, Ltd.

468,428. **Treating Yarns.** J. H. Fenner & Co., Ltd., J. H. Fenner, and S. B. Hainsworth.

468,461. **Rubber Sheets.** A. H. Stevens, (I. B. Kleinert Rubber Co.).

468,543. **Coating with Luminescent Powder.** Franco-British Electrical Co., Ltd., and A. H. Brackensey.

468,586. **Rubber.** Wingfoot Corp.

468,639. **Compound Fabrics.** Ioco Rubber & Waterproofing Co., Ltd., W. H. Nuttall, and C. W. Anderson.

468,861. **Cellular Rubber.** Moulded Hair Co., Ltd., and J. A. Howard.

468,875. **Molding by Dipping.** International Latex Processes, Ltd., E. A. Murphy, G. W. Trobridge, and A. N. Ward.

468,910. **Latex.** Cela Holding Soc. Anon.

469,145. **Coated Fabrics.** A. Von Ledofsky and J. Grabec.

469,203. **Supplying Pulp to Paper Making Machines.** S. Milne.
469,271. **Coated Fabrics.** E. and P. Gheysens.
469,433. **Rubber Threads.** T. L. Shepherd.
469,575. **Treating Textiles.** Cela Holding Soc. Anon.
469,937. **Shaping Paper.** R. C. Cross.

Germany

649,647. **Inserting Fasteners in Rubber Pieces.** H. Gey, Chemnitz.
650,955. **Vulcanizing Hose.** Hydraulik G.m.b.H., Duisburg.
651,013. **Inflatable Rubber Covers.** W. Heuberer, Vienna, Austria. Represented by G. Lotterhos, Frankfurt a.M., and M. Eule, Berlin.
651,329. **Making Articles from Aqueous Rubber Dispersions.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands. Represented by C. and E. Wiegand, both of Berlin.

CHEMICAL

United States

2,096,633. **Rubber Hydrohalide and Polycumarone Composition.** E. Gebauer-Fuelnegg, deceased, late of Evanston, by M. Gebauer-Fuelnegg, administratrix, Evanston, and E. W. Moffett, assignors to Marbon Corp., both of Chicago, all in Ill.
2,096,660. **Rubber Hydrohalide-Paraffin-Resin Compositions.** H. A. Winkelmann, Chicago, Ill., assignor to Marbon Corp., a corporation of Del.
2,096,661. **Rubber Hydrohalide - Ester Gum Compositions.** H. A. Winkelmann, Chicago, Ill., assignor to Marbon Corp., a corporation of Del.
2,096,662. **Polycoumarone-Rubber Hydrohalide Compositions.** H. A. Winkelmann and E. W. Moffett, both of Chicago, Ill., assignors to Marbon Corp., a corporation of Del.
2,097,473 and 2,097,474. **Rubber Preservative.** W. L. Semon, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,098,221. **Binder Material.** P. S. Barnhart, Westfield, assignor to Westfield River Paper Co., Russell, both in Mass.
2,098,223. **Binding Composition for Paper.** P. S. Barnhart, Westfield, assignor to Westfield River Paper Co., Russell, both in Mass.
2,098,429. **Hard Rubber Compound.** J. D. Morron, Detroit, Mich., assignor to United States Rubber Products, Inc., New York, N. Y.
2,098,748. **Wood Flour-Rubber Compositions.** A. J. Jennings, Bridgeport, Conn., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.
2,098,788 and 2,098,789. **Artificial Leather Compositions.** R. Morgan, Drexel Hill, Pa., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.
2,099,651. **Plastic Composition.** E. Helft, Berlin-Halensee, Germany, assignor, by mesne assignments, to "Unichem" Chemikalien Handels A.-G., Zurich, Switzerland.

United Kingdom

467,901. **Moisture-Proof Coating Materials for Rubber.** British Cellophane, Ltd.
468,182. **Resilient Plastic Compositions.** L. A. M. P. de Bouille du Chariol.
468,246. **Shoe Cements.** R. Very.
468,361. **Shoe Cements.** United Shoe Machinery Corp.
468,435. **Deodorized Synthetic Rubber.** Boston Blacking Co., Ltd.
468,658. **Accelerators.** Wingfoot Corp.
468,693. **Synthetic Rubber.** E. I. du Pont de Nemours & Co., Inc., W. H. Carothers, A. M. Collins, and J. E. Kirby.
468,787. **Antioxidants.** W. Baird, R. F. Goldstein, M. Jones, E. M. Meade, and Imperial Chemical Industries, Ltd.
469,109. **Dye for Coloring Rubber.** M. Jones, W. F. Smith, A. Stewart, and Imperial Chemical Industries, Ltd.
469,269. **Gutta Percha Rubber Compositions.** R. D. Boyce and Romac Motor Accessories, Ltd.
469,299. **Rubber-Bonded Abrasive Compositions.** Norton Grinding Wheel Co., Ltd.
469,474. **Accelerators.** W. Baird, G. E. Nettleship, and Imperial Chemical Industries, Ltd.
469,483. **Rubber Compositions for Surgical Supports.** H. P. Stevens and Clayton & Stevens, Ltd.
469,634. **Accelerators.** Wingfoot Corp.
469,754. **Coating Compositions.** E. I. du Pont de Nemours & Co., Inc.
469,801. **Bonding Materials for Rubber.** B. J. Habgood, L. B. Morgan, and Imperial Chemical Industries.
469,820. **Synthetic Rubber.** I. G. Farbenindustrie A. G.
469,865. **Accelerators.** Usines De Melle and H. M. Guinot.

Germany

651,202. **Coloring Organic Plastic Masses.** I. G. Farbenindustrie, A.G., Frankfurt a.M.
651,763. **Accelerator.** I. G. Farbenindustrie A.G., Frankfurt a.M.

GENERAL

United States

2,096,121. **Toy.** E. J. Manelia, assignor to Lee-Tex Rubber Products Corp., both of Chicago, Ill.
2,096,139. **Motor Mounting.** M. L. Spahr, Springfield, assignor to Harris Products Co., Akron, both in O.
2,096,190. **Combined Gear Shift Ball and Light Signal.** A. R. Moeller, Spokane, Wash.
2,096,504. **Horseshoe.** J. E. Anderson, Hamilton, assignor to G. H. Jackson, Ltd., Toronto, both in Ont., Canada.
2,096,816. **Elastic Strand and Fabric.** S. C. Lilley, Hamden, assignor to American Mills Co., W. Haven, both in Conn.
2,096,840. **Cable.** E. Bormann, Berlin-Charlottenburg, assignor to Siemens-Schuckertwerke A.G., Berlin-Siemensstadt, both in Germany.
2,096,961. **Infant Feeding Device.** B. D. Condon, Spokane, Wash.
2,097,092. **Apparatus for Dispensing Hypochlorites.** W. S. Bachman, Los Angeles, Calif.
2,097,200. **Footwear.** N. Menutole, Chelsea, Mass.
2,097,212. **Tabbing Composition.** L. J. D. Healy, Milwaukee, Wis., assignor to Lee Hardware Co., Salina, Kan.
2,097,249. **Snowshoe.** H. B. Keene, Westport, Conn.
2,097,318. **Fan.** M. F. Dowell, Bridgeport, Conn., assignor to General Electric Co., a corporation of N. Y.
2,097,376. **Exerciser.** J. H. Marshman, Arlington, Va.
2,097,417. **Rubber Impregnated Fibrous Material.** S. B. Neiley, Winchester, assignor to Dewey & Almy Chemical Co., N. Cambridge, both in Mass.
2,097,542. **Life Belt.** K. V. G. Wallin, Hedensberg, Sweden.
2,097,588. **Typewriter.** W. A. Dobson, Wethersfield, Conn., assignor to Underwood Elliott Fisher Co., New York, N. Y.
2,097,748. **Tire.** E. V. B. Horst, San Clemente, Calif.
2,097,832. **Lens Marker.** J. L. Brenner, Utica, assignor to Shuron Optical Co., Inc., Geneva, both in N. Y.
2,097,862. **Hose.** H. McKay, assignor to Boston Woven Hose & Rubber Co., both of Cambridge, Mass.
2,098,001. **Rubber Band Gun.** L. and A. Gagnon, both of New York,N. Y.
2,098,038. **Tire.** E. Hazell, New York, and S. R. Ogilby, W. New Brighton, assignors to United States Rubber Products, Inc., New York, all in N. Y.
2,098,106. **Syringe.** C. E. Pieck, Covington, Ky.
2,098,107. **Fan with Rubber Blades.** E. S. Preston, assignor to Chicago Electric Mfg. Co., both of Chicago, Ill.
2,098,127. **Frost Shield.** W. F. Auger, Winnipeg, Man., Canada.
2,098,128. **Rubber Oil Can Spout.** C. M. Bailey, Baton Rouge, La.
2,098,149. **Lamp Cord.** J. H. Jewell and O. A. McNamee, Worcester, Mass., assignors to American Steel & Wire Co. of N. J., a corporation of N. J.
2,098,187. **Adhesive Material.** M. H. Kemp, Oak Park, Ill., assignor to Kendall Co., Boston, Mass.
2,098,277. **Heel.** R. Conticchio, assignor of ½ to J. W. Guzzetta, both of Mt. Vernon, N. Y.
2,098,412. **Rubber Soled Footwear.** N. E. Bovay, Naugatuck, Conn., assignor to United States Rubber Products, Inc., New York, N. Y.
2,098,509. **Handlebar Grip.** J. R. Morgan, Oak Park, assignor to Sears, Roebuck & Co., Chicago, both in Ill.
2,098,658. **Syringe.** J. T. Goltman, Clinton, and J. N. Robbins, Davenport, assignors to Applicator Products Corp., Clinton, all in Iowa.
2,098,859. **Combined Felly, Rim, and Dual Pneumatic Tire Structure.** P. N. Chiasson, Griggsville, Ill.
2,099,006. **Antiskid Device.** E. Eger, Grosse Pointe Park, Mich., assignor to United States Rubber Products, Inc., New York, N. Y.
2,099,099. **Garment.** R. W. Bissell, Milford, assignor to Strouse Adler Co., New Haven, both in Conn.
2,099,209. **Lubricated Rubber Joint.** G. H. Hufferd, Detroit, Mich., assignor to Thompson Products, Inc., Cleveland, O.
2,099,238. **Apparel.** A. Simpson, London, England.
2,099,246. **Tapping Tool.** H. Raffles, Chicago, Ill.
2,099,385. **Pneumatic Tachometer.** U. Ciamberlini, Rome, Italy.
2,099,415. **Protective Jacket for Conductors.** H. V. Wodtke, Plainfield, N. J., assignor to Anaconda Wire & Cable Co., New York, N. Y.
2,099,418. **Bathing Sandal.** C. E. Brad-

ley and K. L. Keene, assignors to Mishawaka Rubber & Woolen Mfg. Co., all of Mishawaka, Ind.

2,099,476. **Waterproof Spat.** M. Glowka, New York, N. Y.

2,099,545. **Belt.** A. A. Teisher and G. I. McNeil, both of Akron, O., assignors to Wingfoot Corp., Wilmington, Del.

2,099,577. **Arch Support Pad.** M. S. Silver, Brookline, Mass.

2,099,613. **Eraser.** J. S. Loewus, Atlanta, Ga.

Dominion of Canada

369,340. **Tobacco Pouch.** Seal-O-Sac (Canada) Ltd., assignee of P. McC. Yeates, both of Toronto, Ont.

369,368. **Garment Band.** Faultless Mfg. Co., assignee of H. Hardie and J. F. Hargreaves, co-inventors, all of Baltimore, Md., U. S. A.

369,369. **Pneumatic Shock Absorbing and Suspension Device.** Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., assignee of R. W. Brown, Akron, O., U. S. A.

369,502. **Foundation Garment.** Kops Bros., Inc., assignee of L. F. Campbell, and W. Kops, co-inventors, all of New York, N. Y., U. S. A.

369,576. **Nonskid Tire Chain.** K. T. M. Svenson, Sonderburg, Vastervik, Sweden.

369,686 and 369,687. **Respirator.** H. S. Cover, South Bend, Ind., U. S. A.

369,702. **Knitted Fabric.** E. J. Martel, Laconia, N. H., U. S. A.

369,710. **Bottle Stopper.** P. Naret, Chisweick, Middlesex, England.

369,798. **Tire Tread.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of G. G. Havens, Detroit, Mich., U. S. A.

369,818. **Anaesthetic Solution Preserving Device.** Novocol Chemical Mfg. Co., Inc., assignee of S. D. Goldberg, both of Brooklyn, N. Y., U. S. A.

United Kingdom

467,537. **Mill for Crushing and Dispensing Tablets.** L. W. Meyer (Miles Laboratories, Inc.).

467,811. **Batteries.** Chloride Electrical Storage Co., Ltd.

467,977. **Electric Hairwaving Heaters.** T. H. Robinson, C. D. Barlow, and W. H. Watson, (trading as Salon Electrical Co.).

468,011. **Surgical Injection Apparatus.** T. Bonnin.

468,067. **Trousers.** H. M., G. Z., and J. M. Selby, and G. Z. Schneiders (trading as S. Schneiders & Son), and M. H. Selby.

468,068. **Compound Sheet Materials.** Allgemeine Elektricitats-Ges.

468,087. **Bed Rests.** Dunlop Rubber Co., Ltd., and G. B. Ainsworth.

468,095. **Vehicle Wheel Scrapers.** Dunlop Rubber Co., Ltd., and F. R. Carr.

468,097. **Grinding Wheels.** Norton Grinding Wheel Co., Ltd.

468,102. **Resilient Supports.** Soc. Italiana Pirelli.

468,114. **Surgical Douches.** A. Boudo.

468,143. and 468,144. **Envelopes.** W. E. Ellens and J. Dickinson & Co., Ltd.

468,162. **Wheel Tires.** Consolidated Rubber Manufacturers, Ltd.

468,165. **Resilient Mountings.** United States Rubber Products, Inc.

468,240. **Billiard Tables.** C. Horton.

468,286. **Hair Nets.** A. A. Coakley.

468,300. **Inclinometers.** G. G. Barker, (Bendix Aviation Corp.).

468,313. **Weighing Apparatus.** R. and E. Abrahamsohn.

468,335. **Body Cavity Inspection Instruments.** G. Wolf Ges.

468,336. **Stretchers.** E. Sarcilly-Ernes.

468,338. **Screw Propellers.** Getefo Ges. Fur Technischen Fortschritt.

468,340. **Bed Rests.** F. W. Beauchamp.

468,400. **Rollers.** F. Schuster.

468,410. **Cable and Sleeves.** F. S. Lobl.

468,419. **Washing Machines.** British Thomson-Houston Co., Ltd.

468,423. **Boots.** W. J. Sisman.

468,443. **Spectacles.** F. L. Grier.

468,446. **Wringers.** British Thomson-Houston Co., Ltd., M. C. I. Hunter, K. M. Mackay, and G. A. Williams.

468,482. **Rollers.** Stowe-Woodward, Inc.

468,544. **Handle Bars.** M. Houdaille and C. Lecler.

468,551. **Tires.** C. Luwaert.

468,554. **Changing Signs.** L. P. Linden.

468,572. **Game Practising Appliances.** E. W. T. Trangmar.

468,578. **Mounting Aircraft and Vehicle Engines.** J. E. Ellor.

468,603. **Mercury Switches for Dispensing Petrol.** F. Hejduk and J. Neumann.

468,604. **Hearing Appliances.** S. Mauer, R. Thein, B. Traub, and V. Frankenstein.

468,682. **Apparatus to Staple Filaments.** R. A. Wolstenholme (Whitin Machine Works).

468,690. **Display Stands.** Acme Showcard & Sign Co., Ltd., and G. Lindsey.

468,698. **Respiratory Appliances.** W. Jackson.

468,711. **Furniture Buffers.** V. Rendle.

468,717. **Apparatus to Make Cords.** J. M. Marti.

468,731. **Packages.** C. E. Gardner.

468,733. **Hair Curling Appliances.** N. L. Solomon.

468,739. **Insoles.** E. Mariotti.

468,803. **Table Mats.** A. Holt.

468,807. **Wheels.** Dunlop Rubber Co., Ltd., and E. F. Goodyear.

469,043. **Caps.** A. E. Hunter.

469,049 and 469,050. **Hydraulic Apparatus.** Dunlop Rubber Co., Ltd., J. Wright, and H. Trevaskis.

469,054. **Valves.** Dunlop Rubber Co., Ltd., J. Wright, and H. Trevaskis.

469,078. **Outboard Motor Installations.** Bendix Aviation Corp.

469,110. **Stuffing Box Packing.** Garlock Packing Co.

469,129. **Anaesthetic Apparatus.** K. J. Box.

469,135. **Combination Garments.** S. L. & M. Feathers, Ltd., and M. Feather.

469,171. **Motor Vehicles.** O. D. North, P. G. Hugh, and Scammell Lorries.

469,181. **Sterilizer.** Reading Cooperative Society, Ltd., and R. Griffiths.

469,234. **Trusses.** E. Lebeau.

469,314. **Buckles.** J. Mouilbau.

469,340. **Insulators.** British Thomson-Houston Co., Ltd.

469,349. **Device to Wash Granular Materials.** L. H. Logue.

469,398. **Combs.** F. D. Hogg.

469,407. **Aircraft Wheel Brakes.** India Rubber, Gutta Percha & Telegraph Works Co., Ltd., and F. J. Tarris.

469,479. **Drums to Manufacture Metal Powders.** English Metal Powder Co., Ltd., and H. Meyersberg.

469,480. **Pipe Joints.** Buderus'sche Eisenwerke.

469,482. **Device to Pick up Tennis Balls.** P. G. Mason and Newman & Guardia, Ltd.

469,495. **Cables.** A. W. Williams.

469,504. **Road Surface Markings.** N. W. Dunn & Co., Ltd., and N. W. Dunn.

469,596. **Gas Blast Switches.** British Thomson-Houston Co., Ltd.

469,632. **Wheels.** B. Rodionoff.

469,697. **Spring Forks.** R. Roberts.

469,700. **Mudguards.** Dunlop Rubber Co., Ltd., and S. Sadler.

469,722. **Endless Track Vehicles.** E. Moglia.

469,762. **Device for Printing on Walls.** J. T. and G. J. McLennan.

469,846. **Centrifugal Spraying Apparatus.** F. H. Loring.

469,853. **Foundation Garments.** A. A. Thornton. (H. W. Gossard Co.).

469,863. **Toy Aerial Bombs.** R. S. MacMeikan and E. C. F. Oakley.

469,878. **Gloves.** R. G. Trevorrow, Ltd., and P. E. Foss.

469,923. **Golf Clubs.** E. L. W. Byrne. (Kroydon Co., Inc.).

469,924. **Upholstery Trimmings.** Soc. Anon. Viralu.

469,938. **Electromagnetic Relays.** Nalder Bros. & Thompson, Ltd., and C. L. Lipman.

Germany

650,886. **Tire Cover.** Continental Gummi-Werke A.G., Hannover.

651,976. **Inner Tube.** Wolff & Co., Komm. Ges. a.A., Walsrode.

652,020. **Airplane De-icer.** Continental Gummi-Werke A.G., Hannover.

TRADE MARKS

United States

351,016. **American Brakeblok.** Fan belts, radiator hose, etc. American Brakeblok Corp., New York, N. Y.

351,017. Rectangle containing the words: **"American Brakeblok."** Fan belts, radiator hose, etc. American Brakeblok Corp., New York, N. Y.

351,022. **Farm Lug.** Tires. Atlas Supply Co., Newark, N. J.

351,090. **Durayon Tires.** Dayton Rubber Mfg. Co., Dayton, O.

351,129. **Correx The Correct Stretchable.** Elastic yarn. Arap Sales Corp., New York, N. Y.

351,212. Label containing the word: **"Scripts"** and representation of a seal containing the words: **"Quality Service Ace Distributors."** Prophylactic goods. Wisconsin Drug & Supply Co., doing business as Ace Distributors, Milwaukee, Wis.

351,335. Diamond containing the word: **"Pac-Oil."** Packing of rubber and fiber. United States Rubber Products, Inc., New York, N. Y.

351,336. Diamond containing the words: **"899 High Heat F. O. P. High Pressure Heat"** surrounded by the words **"Steam-Air Ammonia Gasoline Hot Oil-Gas."** Packing of compacted fibrous material in sheet or cut gasket form. United States Rubber Products, Inc., New York, N. Y.

351,355. **Spintex.** Storage batteries and separator plates. Globe-Union Inc., Milwaukee, Wis.

351,358. Double circle containing the words: **"Minnesota Mining & Mfg. Co.-St. Paul, Minn."** and representation of a diamond inside the circle containing the words; **"3MCo B-A Since 1828."** Adhesives, cements, etc. Minnesota Mining & Mfg. Co., St. Paul, Minn.

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Market Reviews

CRUDE RUBBER

Commodity Exchange

TABULATED WEEK-END CLOSING PRICES

Futures	Sept. 25	Oct. 30	Nov. 6	Nov. 13	Nov. 20
Oct.	18.17	.....	.....	.....	.....
Nov.	.....	15.70	14.43	14.75	14.13
Dec.	18.26	15.74	14.45	14.77	14.15
Mar.	18.38	15.77	14.59	15.00	14.34
July	18.57	15.88	14.73	15.19	14.50
Sept.	.....	15.94	14.78	15.26	14.57
Oct.	.....	.....	14.81	15.29	14.63
Volume per week (tons)	14,920	33,650	17,740	25,080	16,090

THE Commodity Exchange table published here shows prices of representative future contracts on the New York market during the past two months.

On October 30 the price for March futures was 15.77¢ per pound. Since then the market dropped and has fluctuated between 14.34¢ and 15.00¢ per pound to close at 14.34¢ on November 20. During the past four weeks the maximum variation in prices for delivery during the next year was 0.54¢ per pound. Trading amounted to 33,650 tons during the week ending October 30, falling off to 17,740 tons the following week. Trading for the weeks ending November 13 and 20 totaled 25,080 and 16,090 tons respectively.

According to Commodity Exchange statistics, combined shipments from Malaya, Netherland India, and Ceylon during September totaled 91,394 tons. This compares with 90,548 tons in August and only 59,547 tons during September, 1936. For the first nine months of this year total shipments are at a record total of 712,986 tons, against 509,914 tons for the like period in 1936. This increase amounts to 39.8%.

On the following page of this issue are reported United States statistics on imports, consumption, stocks, and crude rubber afloat during October.

New York Outside Market

Lack of factory buying and shipment business persisted during November with factories disposed to reduce inventories further and to await a clarification of the rubber price and consumption outlook before making new commitments. Rubber markets are apparently marking time awaiting the results of the meeting of the International Rubber Regulation Committee scheduled for November 30. Since October 25, when No. 1 ribbed smoked sheets closed at 15½¢ per pound, the price has been mainly downward, closing at 14⅜¢ per pound on November 20; but the turn was upward later in the month.

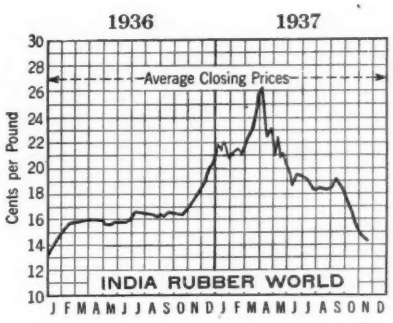
The week-end closing prices on No. 1 ribbed smoked sheets follow: October 30, 15 11/16¢; November 6, 14 7/16; November 13, 14 13/16; November 20, 14⅛; and November 27, 14 11/16¢.

New York Quotations

New York outside market rubber quotations in cents per pound

	Nov. 25, 1936	Oct. 27, 1937	Nov. 26, 1937
Plantations			
Rubber latex...*gal.*	68/69	55/56	54½/55
Paras			
Upriver fine	22½	17	14¾
Upriver fine	*26½	*20¾	*20½
Upriver coarse	12½	10½	9
Upriver coarse	*18¼	*15	*14
Islands fine	21½	16	14
Islands fine	*26	*19	*20
Acre, Bolivian fine	22¾	17¼	15
Acre, Bolivian fine	*26½	*21	*21
Beni, Bolivian fine	23	17¾	15¾
Madeira fine	22½	17¼	14¾
Caucho			
Upper ball	12½	10¼	9
Upper ball	*18¼	*15	*14
Lower ball	12¼	10	8
Pontianak			
Pressed block	10/20	16/32	14/31
Guayule			
Duro, washed and dried	13¾	13½	12½
Ampar	14	14	13
Africans			
Rio Nuñez	16¾	16	15
Black Kassai	16¾	16	16
Prime Niger flake	27	25	24
Gutta Percha			
Gutta Siak	10½	12	15
Gutta Soh	12½	25	24
Red Macassar	1.10	1.05/1.20	1.20/1.25
Balata			
Block, Ciudad Bolivar	32	30	..
Manaos block	25	27	27
Surinam sheets	32	37	35
Amber	36	42	40

*Washed and dried crepe. Shipments from Brazil.



New York Outside Market—Spot Ribbed Smoked Sheets

United States Latex Imports

Year	Pounds	Value
1934	29,276,134	$3,633,253
1935	30,358,748	3,782,222
1936	44,469,504	6,659,899
1937		
Jan.	2,995,027	535,546
Feb.	4,418,474	775,202
Mar.	4,962,915	968,053
Apr.	3,658,660	724,757
May	4,470,572	941,235
June	5,737,563	1,253,370
July	4,302,503	924,127
Aug.	4,033,306	838,778
Sept.	4,258,048	839,159

Data from Leather and Rubber Division, United States Department of Commerce, Washington, D. C.

New York Outside Market—Spot Closing Prices—Plantation Grades—Cents per Pound

	October, 1937						November, 1937																	
	25	26	27	28	29	30	1	*2	3	4	5	6	8	9	10	11*	12	13	15	16	17	18	19	20
No. 1 Ribbed Smoked Sheet	15½	15⅛	14¾	15¼	15⅜	15⅛	15⅛	..	14⅞	14⅛	14⅛	14⅞	14⅝	14	14⅛	..	15⅛	14⅛	14⅛	14⅝	14½	14⅝	14⅝	14⅛
No. 2 Ribbed Smoked Sheet	15¼	14⅞	14½	15	15⅛	15⅛	15⅛	..	14⅝	14⅛	14⅞	14⅛	14	13¾	14⅛	..	14⅞	14⅛	14⅛	14⅛	14¼	14⅛	14⅛	13⅞
No. 3 Ribbed Smoked Sheet	14⅞	14½	14⅛	14⅝	14¾	15⅛	14¾	..	14⅞	14⅛	14⅛	13⅞	13⅝	13⅜	14⅛	..	14½	14⅛	14	13⅝	13¾	13⅛	13⅞	13⅜
No. 4 Ribbed Smoked Sheet	14⅝	14¼	13⅞	14⅜	14½	14⅛	14½	..	14⅛	13⅞	13⅞	13⅝	13⅞	13⅛	14⅛	..	14⅛	14	13⅛	13½	13⅛	13⅞	13⅞	13⅛
No. 1 Thin Latex Crepe	16¼	15⅞	15½	16	16⅛	16⅛	16	..	15⅞	15⅜	15⅜	15⅛	14⅞	14½	15⅛	..	15⅝	15⅜	15⅛	14¾	15	15⅛	14⅛	14⅝
No. 1 Thick Latex Crepe	16⅜	16	15⅜	16⅛	16⅛	16⅛	16⅛	..	15⅛	15½	15½	15¼	15	14⅝	15⅛	..	15¾	15⅛	15¼	14¾	15	15⅛	14⅛	14⅜
No. 1 Brown Crepe	14⅝	14¼	13⅞	14⅜	14½	14⅛	14⅜	..	13⅛	13¾	13⅜	13⅛	13¼	13⅛	14⅛	..	14¼	13⅛	13¾	13⅜	13⅝	13⅛	13⅛	13¼
No. 2 Brown Crepe	14½	14⅛	13¾	14¼	14⅜	14⅛	14¼	..	13⅛	13⅝	13⅝	13⅜	13⅛	13	13⅛	..	14⅛	13⅛	13⅜	13¼	13½	13	13⅛	13¼
No. 2 Amber	14⅝	14¼	13⅞	14⅜	14½	14⅛	14⅜	..	13⅛	13¾	13¾	13½	13⅛	13⅛	14⅛	..	14¼	13⅛	13¾	13⅜	13⅝	13⅛	13⅛	13¼
No. 3 Amber	14½	14⅛	13¾	14¼	14⅜	14⅛	14¼	..	13⅛	13⅝	13⅝	13⅜	13⅛	13	13⅛	..	14⅛	13⅛	13⅜	13⅛	13½	13	13⅛	13⅛
No. 4 Amber	14	13⅝	13¼	13¾	13⅞	14⅛	13½	..	13⅛	12⅞	12⅞	12⅝	12⅜	12⅜	13⅛	..	13½	13⅜	13	12½	12¾	12⅛	12⅞	12⅝
Rolled Brown	12	11⅝	11⅝	12⅛	12¼	12⅛	12	..	11⅞	11⅜	11⅜	11⅛	10⅞	10⅜	11⅛	..	12	11⅛	11½	11	11¼	11⅞	10⅛	10¾

*Holiday.

RECLAIMED RUBBER

United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption†	Consumption % to Crude	U. S. Stocks*	Exports
1935	122,140	113,530	22.9	25,069	5,383
1936	150,571	141,486	24.6	19,000	7,085
1937					
January	15,129	14,450	28.4	18,822	857
February	15,192	14,578	28.1	18,490	946
March	14,462	15,601	28.9	16,450	901
April	13,884	15,607	30.1	14,046	1,140
May	15,793	14,693	28.4	14,647	890
June	16,052	14,414	27.8	14,535	1,077
July	16,241	12,128	27.3	17,682	1,221
August	16,543	13,227	31.9	19,706	1,240
September	16,410	13,681	31.2	21,597	1,152
October	15,849	12,234	31.6	23,752	....

*Stocks on hand the last of the month or year. †Corrected to 100% from estimate of reported coverage.
Compiled by The Rubber Manufacturers Association, Inc.

CONSUMPTION of reclaim in the United States during October is estimated at 12,234 tons; production, 15,849 tons; and stocks on hand October 31, 23,572 tons, according to The Rubber Manufacturers Association, Inc. Consumption of reclaim during September totaled 13,681 tons. In keeping with other lines of business, the demand for reclaim has eased off considerably. A very good third quarter was reported, and the year to date is ahead of 1936. If the anticipated production and sale of 1938 automobiles is reached, fairly satisfactory conditions should exist in the reclaiming business. Reclaim prices continue unchanged.

New York Quotations

November 22, 1937

	Sp. Grav.	¢ per lb.
Auto Tire		
Black Select	1.16-1.18	6¼/ 6½
Acid	1.18-1.22	7¼/ 7½
Shoe		
Standard	1.56-1.60	7 / 7¼
Tube		
No. 1 Floating	1.00	19 /19¼
Compounded	1.10-1.12	10½/11
Red Tube	1.15-1.30	10½/11
Miscellaneous		
Mechanical Blends	1.25-1.50	4½/ 5
White	1.35-1.50	15 /15½

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

IMPORTS, CONSUMPTION, AND STOCKS

CRUDE rubber consumption by United States manufacturers during October is estimated at 38,707 long tons, against 43,893 long tons in September, 11.8% under September and 22% under the 49,637 (revised) long tons of October, 1936, according to R. M. A. statistics.

Gross imports of crude rubber for October are reported to be 52,508 long tons, 6.3% under the September figure of 56,049 long tons, but 28.3% over the 40,920 long tons in October, 1936.

Total domestic stocks of crude rubber on hand October 31 are set at 195,685 long tons, compared with September 30 stocks of 182,556 long tons and 224,000 (revised) long tons on hand October 31, 1936.

Crude rubber afloat to United States ports as of October 31 is estimated at 80,653 long tons, against 83,288 long tons afloat on September 30 and 67,825 long tons afloat on October 31, 1936.

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks

Twelve Months	U. S. Imports* Tons	U. S. Consumption‖ Tons	U. S. Stocks Mfgrs. Importers, Dealers, Etc.† Tons	U. S. Stocks Afloat† Tons	U. K.— Public Warehouses, London, Liverpool†‡ Tons	Singapore and Penang Dealers and Port Stocks†‡ Tons	World Production (Net Exports)‡ Tons	World Consumption Estimated‡ Tons	World Stocks†‡‖ Tons
1934	469,484	453,223	355,000	47,644	134,927	62,142	1,019,100	921,141	747,140
1935	448,116	491,544	303,000	39,094	164,295	28,304	872,600	937,489	650,494
1936	490,858	575,000	223,000	56,567	78,462	26,969	855,627	1,044,776	464,186
1937									
January	32,820	50,818	204,201	55,096	71,062	36,365	71,540	**92,926	422,426
February	43,289	51,887	195,080	53,538	63,760	42,132	70,539	93,042	407,807
March	52,039	54,064	191,928	56,994	52,077	42,485	102,428	104,696	445,722
April	35,850	51,797	174,934	72,530	48,748	38,812	89,611	93,566	401,027
May	50,840	51,733	172,985	58,542	46,628	34,234	87,030	101,245	386,403
June	48,956	51,798	169,646	57,215	43,427	45,085	96,111	102,003	414,990
July	39,108	43,650	164,445	75,779	42,175	44,776	112,374	89,762	408,800
August	48,785	41,456	171,052	80,439	45,211	47,886	102,557	90,008	417,095
September	56,049	43,893	182,556	83,288	49,807	49,448	106,697	.....	457,098
October	52,508	38,707	195,685	80,653	.....	.....	.....	.....	.....

* Including liquid latex. †Stocks on hand the last of the month or year. ‡Statistical Bulletin of the International Rubber Regulation Committee. ‖Stocks at U. S. A., U. K., Singapore and Penang, Para, Manaos, and afloat. ¶Corrected to 100% from estimate of reported coverage. **Not including additional absorption from U.K. manufacturers' stocks for any month during 1937. The figure will be included in yearly total.

RUBBER SCRAP

CONSUMPTION of scrap rubber fell off to some extent during the past month. The demand for beadless tire scrap has been holding firm. A scarcity of tire grades has resulted from a slackening in dealer activity.

The market is easier this month, price reductions having been made on most grades. Boot and shoe grades receded ⅛ to ¼¢ per pound; tubes are off 1 to 1½¢ per pound, and tire grades dropped 50¢ to $3 per ton. Hard rubber scrap receded 1¢ per pound. Mixed black scrap and hose, air brake mechanical grades are off $3 to $3.50 per ton. No. 1 red and standard mechanical scrap dropped ½ to 1¢ per pound. Other mechanical grades remained the same as on October 22.

CONSUMERS' BUYING PRICES

(Carload Lots Delivered Eastern Mills)

November 22, 1937

		Prices
Boots and Shoes		
Boots and shoes, black	lb.	$0.01⅛/$0.01¼
Colored	lb.	.00¾/ .00⅞
Untrimmed arctics	lb.	.00¾/ .00⅞
Inner Tubes		
No. 1, floating	lb.	.11 / .11½
No. 2, compound	lb.	.04½/ .04¾
Red	lb.	.04¼/ 04½
Mixed tubes	lb.	.04 / .04¼
Tires (Akron District)		
Pneumatic Standard		
Mixed auto tires with beads	ton	14.00 /14.50
Beadless	ton	19.00 /19.50
Auto tire carcass	ton	21.00 /22.00
Black auto peelings	ton	24.00 /25.00
Solid		
Clean mixed truck	ton	30.00 /31.00
Light gravity	ton	42.00 /43.00
Mechanicals		
Mixed black scrap	ton	22.00 /24.00
Hose, air brake	ton	26.00 /28.00
Garden, rubber covered	ton	14.00 /15.00
Steam and water, soft	ton	14.00 /15.00
No. 1 red	lb.	.03 / .03¼
No. 2 red	lb.	.02¾/ .03
White druggists' sundries	lb.	.04¼/ .04½
Mechanical	lb.	.01¾/ .02
Hard Rubber		
No. 1 hard rubber	lb.	.13½/ .14½

London and Liverpool Stocks

Week Ended	Tons London	Tons Liverpool
October 30	30,455	21,371
November 6	31,403	20,628
November 13	31,688	20,376
November 20	32,594	20,817
November 27	33,232	21,555

Wall Rubber

WINGFOOT wall rubber, used principally for kitchen and bathroom, is also applicable where cleanliness, wearing qualities, and appearance are important. It can be attached to smooth clean surfaces of plaster, wood, steel, or composition materials. Backed with fabric, it can be applied easily with a latex-type cement. Wall rubber, available in a variety of colors, is supplied in sheet form, 36 inches wide and up to 30 yards in length. The Goodyear Tire & Rubber Co., Inc.

ADVERTISING PAGES REMOVED

COMPOUNDING INGREDIENTS

THE inactivity in evidence in October continued through November. In general, buying has been limited with consumers showing little disposition to purchase ahead. An easier market, as reflected in the lower prices noted in some quarters, may form the basis for a movement into consuming channels.

CARBON BLACK. Prices for standard grade blacks in carload lots were reduced 1¢ per pound in bags and 1¢ per pound in bulk. Early in November the car lot price, delivered Akron, was reduced to 4.30¢ per pound in bags and 4.05¢ per pound in bulk. Thus, a differential of ¼¢ per pound was established between bag and bulk prices. Later the same price of 4.05¢ was set for bulk and bag shipments. This is only ¼¢ above the depression low price and is probably below cost. It is to be expected that this low price cannot hold for very long.

FACTICE OR RUBBER SUBSTITUTE. Demand continued somewhat low during November. Brown and white Factice prices receded ½ to 1¢ per pound; while other grades remained at former levels.

LITHARGE. Owing to reduction in metal prices car lot prices of litharge declined ½¢ per pound, reaching 6½¢ to 6¾¢ per pound. The l.c.l. prices were lowered ¼¢ per pound. The market was slow along with the low rate of activity in other pigments.

LITHOPONE. Prices held without change at the schedule that has been in force for some time. Lithopone makers are offering contracts for 1938 at the prices now in effect. Trading was light.

RUBBER CHEMICALS. Although business was less active in November than in the preceding two months, the recession has been less than indicated by general business. Prices which remained unchanged are expected, in general, to continue at the same level into 1938.

RUBBER SOLVENTS. The movement of solvent into the Akron district was somewhat faster, but still failed to reach more than modest proportions. During the last week of October refiners in the Midcontinent sector reduced prices for light and heavy grades to 6⅞¢ to 7⅜¢ per gallon, a reduction of ½¢. However former prices were restored at the middle of November.

STEARIC ACID. No broadening of trade was noted, and consumers have been limiting their purchases to small or moderate quantities. Selling schedules were lowered ½¢ per pound by producers, following a decline in basic material.

TITANIUM PIGMENTS. Effective November 15, producers began offering contracts for 1938 at unchanged prices from those at the present levels. October closed out slowly, and trade has been poor since. A new pigment, phthalate treated titanium dioxide, is now being offered by a leading producer at 24¢ per pound in car lot amounts in bags. It is reported that in Japan a process has been developed for making titanium dioxide by treating a slag obtained in the manufacture of vanadium steel from iron sand.

ZINC OXIDE. Following a decline in the price of lead, prices for 35% and 50% leaded zinc oxides were reduced ⅛¢ and ¼¢ per pound, respectively. The 35% grade is now priced at 6¼¢ to 6½¢ per pound, and 50% strength is at 6⅜¢ to 6⅝¢ per pound. The tire trade's purchases were light during the month. September exports were reported by the Department of Commerce as having totaled 212,194 pounds.

New York Quotations

November 23, 1937

Prices Not Reported Will Be Supplied on Application

Abrasives

Pumicestone, powdered	lb.	$0.03	/$0.035
Rottenstone, domestic	lb.	.03	/ .035
Silica, 15	ton	38.00	

Accelerators, Inorganic

Lime, hydrated, l.c.l., New York	ton	20.00	
Litharge (commercial)	lb.	.0725/	.0775

Accelerators, Organic

A-1	lb.	.26	
A-5-10	lb.	.34	
A-10	lb.	.34	
A-11	lb.	.57	
A-19	lb.	.57	
A-32	lb.	.72	
A-77	lb.	.47	
A-100	lb.	.47	
A-433	lb.	.50	
Accelerator 49	lb.	.42	
808	lb.		
833	lb.		
Acrin	lb.		
Aldehyde ammonia	lb.		
Altax	lb.		
B-J-F	lb.		
Beutene	lb.		
Butyl Zimate	lb.		
C-P-B	lb.		
Captax	lb.		
Crylene	lb.		
Paste	lb.		
D-B-A	lb.		
Di-Esterex	lb.		
Di-Esterex-N	lb.		
DOTG	lb.	.47	
D.O.T.T.U.	lb.		
DPG	lb.	.37	
El-Sixty	lb.	.57	
Ethylideneaniline	lb.		
Formaldehyde P.A.C.	lb.		
Formaldehydeaniline	lb.		
Formaldehyde-para-toluidine	lb.		
Guantal	lb.	.40	/ .50
Hepteen	lb.		
Base	lb.		
Hexamethylenetetramine	lb.		
Lead oleate, No. 999	lb.	.14	
Witco	lb.	.15	
Methylenedianilide	lb.		
Monex	lb.		
Novex	lb.		
O. N. V.	lb.		
Ovac	lb.		
Pip-Pip	lb.	$2.50	
Pipsolene	lb.	1.80	
R-2	lb.	1.70	
Base	lb.	3.65	
R-23	lb.	.57	
R & H 50-D	lb.		
Safex	lb.		
Super-sulphur No. 1	lb.		
No. 2	lb.		
Tetrone A	lb.		
Thiocarbanilide	lb.		
Thionex	lb.		
Trimene	lb.		
Base	lb.		
Triphenyl guanidine (TPG)	lb.		
Tuads	lb.		
Ureka	lb.	.65	
Blend B	lb.	.65	
C	lb.	.60	
Vulcanex	lb.		
Vulcanol	lb.		
Vulcone	lb.		
Z-B-X	lb.		
Z-88-P	lb.	.51	
Zenite	lb.		
A	lb.		
B	lb.		
Zimate	lb.		
ZML	lb.		

Activator

Barak	lb.		

Age Resisters

AgeRite Alba	lb.		
Exel	lb.		
Gel	lb.		
Hipar	lb.		
HP	lb.		
Powder	lb.		
Resin	lb.		
D	lb.		
Syrup	lb.		
White	lb.		
Akroflex C	lb.		
Albasan	lb.		
Antox	lb.		
B-L-E	lb.		
B-X-A	lb.		
Copper Inhibitor X-872	lb.		
Flectol B	lb.	$0.54	
H	lb.	.54	
White	lb.	1.00	
M-U-F	lb.		
Neozone (standard)	lb.		
A	lb.		
C	lb.		
D	lb.		
E	lb.		
Oxynone	lb.	.68	
Parazone	lb.		
Perflectol	lb.	.67	
Permalux	lb.		
Santoflex A	lb		
B	lb.	.54	
Solux	lb.		
Thermoflex	lb.		
A	lb.		
V-G-B	lb.		

Alkalies

Caustic soda, flake, Columbia (400 lb. drums)	100 lbs.	2.70	/$3.30
liquid, 50%	100 lbs.	1.95	
solid (700 lb. drums)	100 lbs.	2.30	/ 3.05

Antiscorch Materials

A-F-B	lb.		
Antiscorch T	lb.		
Cumar RH	lb.	.09	
R-17 Resin (drums)	lb.	.10	
Retarder B	lb.		
W	lb.		
T-J-B	lb.		
U.T.B.	lb.		

Antisun Materials

Heliozone	lb.		
Sunproof	lb.		

Brake Lining Saturant

B. R. T. No. 3	lb.	.0165/	.0175

Colors

BLACK

Lampblack (commercial)	lb.	.15	

BLUE

Brilliant	lb.		
Prussian	lb.	.0375	
Toners	lb.	.08	/ 3.85

BROWN

Mapico	lb.	.13	

GREEN
- Brilliant ..... lb.
- Chrome, light ..... lb.
- medium ..... lb.
- **oxide (freight allowed)** .. lb. $0.21
- Dark ..... lb.
- **Guignet's, Easton, Pa., bbls.** .. lb. .70
- Light ..... lb.
- Toners ..... lb. .85 /$3.75

ORANGE
- Lake ..... lb.
- Toners ..... lb. .40 / 1.60

ORCHID
- Toners ..... lb. 1.50 / 2.00

PINK
- Toners ..... lb. 1.50 / 4.15

PURPLE
- Permanent ..... lb.
- Toners ..... lb. .60 / 2.10

RED
- Antimony
- Crimson, 15/17% ..... lb. .45
- R. M. P. No. 3 ..... lb. .48
- Sulphur free ..... lb. .50
- R.M.P. ..... lb. .52
- Golden 15/17% ..... lb. .28
- 7-A ..... lb. .37
- Z-2 ..... lb. .23
- Aristi ..... lb. 1.75
- Cadmium, light (400 lb. bbls.) ..... lb. .76 / .81
- Chinese ..... lb.
- Crimson ..... lb.
- Mapico ..... lb. .0925
- Medium ..... lb.
- Rub-Er-Red, Easton, Pa., bbls. ..... lb. .0925
- Scarlet ..... lb.
- Toners ..... lb. .08 / 2.00

WHITE
- **Lithopone (bags)** ..... lb. .04½/ .04¾
- Albalith Black Label-11 .. lb. .04¾/ .04⅝
- **Astrolith** ..... lb. .04¾/ .04⅝
- **Azolith** ..... lb. .04¾/ .04⅝
- **Cryptone-19** ..... lb. .05⅞/ .06⅛
- CB-21 ..... lb. .05⅞/ .06⅛
- ZS No. 20 ..... lb. .09 / .0925
- No. 86 ..... lb. .09 / .0925
- Sunolith ..... lb. .04¾/ .04⅝
- Ray-Bar ..... lb.
- Ray-Cal ..... lb.
- Rayox ..... lb.
- Titanolith (5-ton lots) .... lb. .05⅞/ .06⅛
- Titanox-A (50-lb. bags) .... lb. .16 / .1675
- B (50-lb. bags) ..... lb. .05⅞/ .06⅛
- B-30 (50-lb. bags) ..... lb. .05⅞/ .06⅛
- C (50-lb. bags) ..... lb. .05⅞/ .06⅛
- Ti-Tone ..... lb.
- Zinc Oxide
- Anaconda, Green Seal
- No. 333 ..... lb. .08 / .085
- Lead Free No. 352 .... lb. .075 / .08
- No. 570 ..... lb. .075 / .08
- No. 577 ..... lb. .075 / .08
- Red Seal No. 222 .... lb. .075 / .08
- U.S.P. No. 777 (bbls.) lb. .095 / .0975
- White Seal No. 555 ... lb. .085 / .09
- Azo ZZZ-11 ..... lb. .0625/ .065
- 44 ..... lb. .0625/ .065
- 55 ..... lb. .0625/ .065
- 66 ..... lb. .0625/ .065
- French Process, Florence
- White Seal-7 (bbls.) ... lb. .085 / .0875
- Green Seal-8 ..... lb. .08 / .0825
- Red Seal-9 ..... lb. .075 / .0775
- Kadox, Black Label-15 ... lb. .065 / .0675
- Blue Label-16 ..... lb. .065 / .0675
- Red Label-17 ..... lb. .065 / .0675
- No. 25 ..... lb. .075 / .0775
- Horse Head Special 3 .... lb. .0625/ .065
- XX Red-4 ..... lb. .0625/ .065
- 23 ..... lb. .0625/ .065
- 72 ..... lb. .0625/ .065
- 78 ..... lb. .0625/ .065
- 80 ..... lb. .0625/ .065
- 103 ..... lb. .0625/ .065
- 110 ..... lb. .0625/ .065
- St. Joe (lead free)
- Black Label ..... lb. .0625/ .065
- Green Label ..... lb. .0625/ .065
- Red Label ..... lb. .0625/ .065
- U.S.P. ..... lb. .095 / .0975
- White Jack ..... lb. .09 / .0925

YELLOW
- Cadmolith (cadmium yellow), 400 lb. bbls. ..... lb. .51 / .56
- Lemon ..... lb.
- Mapico ..... lb. .095
- Toners ..... lb. 2.50

Dispersing Agents
- Bardol ..... lb. .0215/ .024
- Darvan ..... lb.
- Nevoll (drums) ..... lb. .0215/ .024
- Santomerse ..... lb. .13

Fillers, Inert
- Asbestine, c.l., f.o.b. mills ..... ton 15.00
- Barytes ..... ton 30.00 /36.00
- f.o.b. St. Louis (50 lb. paper bags) ..... ton 22.85 /23.05
- Barytes, off color, domestic ..... ton $20.00 / $25.00
- white, imported ..... ton 29.00 /32.00
- Blanc fixe, dry, precip. ... lb. .035 / .05
- Calcene ..... ton 37.50 /45.00
- Infusorial earth ..... lb. .02 / .03
- Kalite No. 1 ..... ton
- No. 3 ..... ton
- Magnesia, calcined, heavy .. lb. .04
- Carbonate L.C.L. ..... lb. .065 / .09
- Pyrax ..... ton
- Whiting
- Columbia Filler ..... ton 9.00 /14.00
- Domestic ..... 100 lbs.
- Guilders ..... 100 lbs.
- Hakuenka ..... lb.
- Paris white, English cliff-stone ..... 100 lbs.
- Southwark Brand, Commercial ..... 100 lbs.
- All other grades ... 100 lbs.
- Suprex, white extra light ..... ton 45.40 /60.00
- heavy ..... ton 45.40 /60.00
- Witco, c.l. ..... ton 7.00

Fillers for Pliability
- P-33 ..... lb.
- Thermax ..... lb.
- Velvetex ..... lb. .03 / .045

Finishes
- IVCO lacquer, clear ..... gal. 2.15 / 2.50
- colors ..... gal. 2.60 / 4.70
- Rubber lacquer, clear ..... gal.
- colored ..... gal.
- Starch, corn, pwd. .... 100 lbs.
- potato ..... lb.
- Talc ..... ton 25.00 /45.00

Flock
- Cotton flock, dark ..... lb. .12 / .13
- dyed ..... lb. .50 / .85
- white ..... lb. .145 / .20
- Rayon flock, colored ..... lb. 1.25 / 2.00
- white ..... lb. 1.00 / 1.25

Latex Compounding Ingredients
- Accelerator 85 ..... lb.
- 89 ..... lb.
- 122 ..... lb.
- 552 ..... lb.
- Aerosol ..... lb. .45
- Antox, Dispersed ..... lb.
- Aquarex A ..... lb.
- D ..... lb.
- F ..... lb.
- Areskap No. 50 ..... lb. .20
- No. 100, dry ..... lb. .43
- Aresket No. 240 ..... lb. .18
- No. 250, alcoholic ..... lb. .22
- No. 300, dry ..... lb. .46
- Areskleno No. 375 ..... lb. .40
- No. 400, dry ..... lb. .56
- Black No. 25, Dispersed ... lb. .22 / .40
- Catalpo ..... ton
- Color Pastes, Dispersed .... lb.
- Dispersex No. 15 .. .. lb. .11 / .12
- No. 20 ..... lb. .08 / .10
- Emo, brown ..... lb. .16
- white ..... lb. .16
- Factice Compound, Dispersed ..... lb. .40
- Heliozone, Dispersed ..... lb.
- Igepon A ..... lb.
- MICRONEX, Colloidal .... lb. .06 / .07
- Nekal BX (dry) ..... lb.
- Palmol ..... lb. .10
- Paradors ..... lb.
- R-23 ..... lb. .57
- S.1 (400 lb. drums) ..... lb. .60
- Santomerse ..... lb. .13
- Stablex A ..... lb. .90 / 1.10
- B ..... lb. .65 / .90
- C ..... lb. .40 / .50
- Sulphur, Dispersed ..... lb. .10 / .15
- No. 2 ..... lb.
- T.1. (400 lb. drums) ..... lb. .40
- Tepidone ..... lb.
- Vulcan Colors ..... lb.
- Zinc oxide, Colloidal ..... lb.
- Dispersed ..... lb. .12 / .15

Mineral Rubber
- B. R. C. No. 20 ..... lb. .009 / .01
- Black Diamond ..... ton 25.00
- Genasco Hydrocarbon, granulated, (fact'y) ... ton
- solid ..... ton
- Gilsonite Hydrocarbon (factory) ..... ton
- Hydrocarbon, hard ..... ton
- soft ..... ton
- Parmr Grade 1 ..... ton 25.00 /27.00
- Grade 2 ..... ton 25.00 /27.00
- Pioneer ..... ton
- 265° ..... ton

Mold Lubricants
- Lubrex ..... lb. .25 / .30
- Mold Paste ..... lb. .18
- Sericite ..... ton 65.00 /75.00
- Soapbark ..... lb.
- Soapstone ..... ton 25.00 /35.00

Oil Resistant
- AXF ..... lb.

Reclaiming Oils
- B. R. V. ..... lb. $0.03 /$0.0325
- S. R. O. ..... lb. .0175/ .0185

Reenforcers
- Carbon Black
- Aerfloted Arrow Specification Black ..... lb. .0435/ .0775
- Arrow Compact Granulized Carbon Black ..... lb. .0435/ .0775
- "Certified" Heavy Compressed, Cabot ..... lb.
- Spheron ..... lb.
- Continental Dustless .... lb. .0345/ .0435
- Compressed c.l. ..... lb. .0345/ .0435
- Uncompressed, c.l. ... lb. .0345/ .0435
- Disperso, c.l. ..... lb. .0345/ .0435
- Dixie, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. ... lb. .037
- c.l., delivered New York. lb. .046
- local stock, bags, delivered ..... lb. .07
- Dixiedensed, c.l., f.o.b., New Orleans, La., Galveston or Houston, Tex. ... lb. .037
- c.l., delivered New York. lb. .046
- local stock, bags, delivered ..... lb. .07
- Dixiedensed 66, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. ..... lb. .037
- c.l., delivered New York. lb. .046
- local stock, bags, delivered ..... lb. .07
- Excello, c.l., f.o.b. Gulf ports ..... lb. .0445/ .0645
- delivered New York. lb. .0505/ .0705
- l.c.l., delivered New York ..... lb. .07 / .09
- Fumonex, c.l., f.o.b. works. lb. .03
- ex-warehouse ..... lb. .045
- Gastex ..... lb. .03 / .07
- Kosmobile, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. ... lb. .037
- c.l., delivered New York. lb. .046
- local stock, bags, delivered ..... lb. .07
- Kosmobile 66, c.l., f.o.b New Orleans, La., Galveston or Houston, Tex. ..... lb. .037
- c.l., delivered New York. lb. .046
- local stock, bags, delivered ..... lb. .07
- Kosmos, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. ... lb. .037
- c.l., delivered New York. lb. .046
- local stock, bags, delivered ..... lb. .07
- MICRONEX Beads, c.l., f.o.b. Gulf ports ... lb. .0345
- c.l., delivered New York ..... lb. .0435
- local, stock, bags, delivered ..... lb. .07
- Mark II, c.l., f.o.b. Gulf ports ..... lb. .0345
- c.l., delivered New York ..... lb. .0435
- local, stock, bags, delivered ..... lb. .07
- Standard, c.l., f.o.b. Gulf ports ..... lb. .0345
- c.l., delivered New York ..... lb. .0435
- local, stock, bags, delivered ..... lb. .07
- W-5, c.l., f.o.b., Gulf ports ..... lb. .0345
- c.l., delivered New York ..... lb. .0435
- local, stock, bags, delivered ..... lb. .07
- W-6, c.l., f.o.b., Gulf ports ..... lb. .0345
- c.l., delivered New York ..... lb. .0435
- local, stock, bags, delivered ..... lb. .07
- Paradene No. 2 (drums). lb. .04
- Pelletex ..... lb. .03 / .07
- Supreme, c.l., f.o.b. Gulf ports ..... lb. .0445/ .0645
- delivered New York ... lb. .0505/ .0705
- l.c.l. delivered New York ..... lb. .07 / .09
- "WYEX BLACK" ..... lb. .0435/ .0775
- Carbonex ..... lb. .029 / .0315
- Carbonex "S" ..... lb. .0315/ .034
- Clays
- Aerfloted Paragon (bulk). ton 6.50
- Suprex No. 1 Selected. ton 10.00
- No. 2 Standard .... ton 9.00
- China ..... ton 17.50 /20.00
- Dixie ..... ton
- Junior ..... ton
- McNamee ..... ton
- Par ..... ton
- Witco, f.o.b. Works .... ton 9.00
- Cumar EX ..... lb. .035

(Continued on page 86)

Is Smoked Sheet and Reclaim

ODOR

Giving You Trouble?

If you are using smoked sheet and reclaim in products where you formerly used pale crepe—no doubt you *are* having trouble with bad odor.

GIVAUDAN

PARA-DORS

are developed specifically to mask undesirable odors in rubber products. Their efficiency has been demonstrated conclusively. You can use them to keep down your costs and still produce merchandise that is completely satisfactory from the odor standpoint. Your request for samples and full information will receive prompt attention.

GIVAUDAN

DELAWANNA, INC.

Industrial Aromatics Division

80 Fifth Avenue, New York, N. Y.

Regular and Special Constructions

of

COTTON FABRICS

Single Filling · Double Filling

and

ARMY

Ducks

HOSE and BELTING

Ducks

Drills

Selected

Osnaburgs

Curran & Barry

320 BROADWAY

NEW YORK

COTTON AND FABRICS

NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES

Futures	Sept. 25	Oct. 30	Nov. 6	Nov. 13	Nov. 20
Oct.	8.39	....	....	....	....
Nov.	....	8.05	7.70	....	....
Dec.	8.25	8.04	7.70	7.85	7.76
Mar.	8.33	8.00	7.75	7.95	7.86
July	8.54	7.99	7.84	8.05	7.93
Sept.	....	8.07	7.91	8.11	7.99
Oct.	....	8.10	7.94	8.15	8.03

New York Quotations

November 24, 1937

Drills

38-inch 2.00-yard	yd.	$0.11½
40-inch 3.47-yard		.06⅞
50-inch 1.52-yard		.15½
52-inch 1.85-yard		.13
52-inch 1.90-yard		.12⅞
52-inch 2.20-yard		.11¾
52-inch 2.50-yard		.10⅜
59-inch 1.85-yard		.13¼

Ducks

38-inch 2.00-yard D. F.	yd.	.11½
40-inch 1.45-yard S. F.		.16¼
51½-inch 1.35-yard D. F.		.17
72-inch 1.05-yard D. F.		.24¾
72-inch 17.21-ounce		.27½

Mechanicals

Hose and belting	lb.	.25

Tennis

52-inch 1.35-yard	yd.	.17½

Hollands

Gold Seal and Eagle

20-inch No. 72	yd.	.10
30-inch No. 72		.18
40-inch No. 72		.20

Red Seal and Cardinal

20-inch	yd.	.08½
30-inch		.15¾
40-inch		.17
50-inch		.25

Osnaburgs

40-inch 2.34-yard	yd.	.10
40-inch 2.48-yard		.09½
40-inch 2.56-yard		.08½
40-inch 3.00-yard		07⅞
40-inch 7-ounce part waste		.07
40-inch 10-ounce part waste		.10
37-inch 2.42-yard		.09¾

Raincoat Fabrics

Cotton

Bombazine 60 x 64	yd.	.07½
Plaids 60 x 48		.10¾
Surface prints 60 x 64		.11½
Print cloth, 38½-inch, 60 x 64		.04⅝

Sheetings—40-Inch

48 x 48, 2.50-yard	yd.	.07⅞
64 x 68, 3.15-yard		.07½
56 x 60, 3.60-yard		.06½
44 x 40, 4.25-yard		.05⅛

Sheetings, 36-Inch

48 x 48, 5.00-yard	yd.	.04⅜
44 x 40, 6.15-yard		.03⅜

Tire Fabrics

Builder

17¼ ounce 60" 23/11 ply Karded peeler	lb.	.29½

Chafer

14 ounce 60" 20/8 ply Karded peeler	lb.	.29½
9¼ ounce 60" 10/2 ply Karded peeler	lb.	.28½

Cord Fabrics

23/5/3 Karded peeler, 1 1/16" cotton	lb.	.30½
15/3/3 Karded peeler, 1 1/16" cotton	lb.	.28½
23/5/3 Karded peeler, 1¼" cotton	lb.	.36
23/5/3 Combed Egyptian	lb.	.49½

Leno Breaker

8¼ ounce and 10¼ ounce 60" Karded peeler	lb.	.31¼

THE accompanying table of week-end closing prices on the New York Cotton Exchange shows the week-end change of representative futures covering the past two months.

After closing at 8.34¢ per pound on October 25 the New York spot middling price declined to reach 7.79¢ on November 4, a new low since April, 1933. It then fluctuated between 7.83¢ and 8.13¢ per pound to close at 7.91¢ on November 20. On November 8 the Government Crop Reporting Board estimated cotton production at 18,243,000 bales, an increase of 670,000 bales over October's report. This estimate indicates the largest crop produced in history, but in the face of this bearish report spot cotton closed 12 points up on that day.

Sales at 13 southern markets totaled 588,296 bales during 21 days since October 23, as compared with 963,649 bales for the same days in 1936. Trading was light during November and the last days of October. This light activity was probably due to the increased amount of cotton going to the Government under the loan plan and the curtailment of mill demand.

Interest is centered on the cotton control plan for the next crop, which is undetermined as yet. It is believed that, if current price levels prevail, more than 6,000,000 bales of cotton may go into Government loan stocks. Through November 18, loans had been made on 2,270,217 bales according to a *Journal of Commerce* statement.

Consumption of all cotton in domestic mills totaled 526,464 bales, against 601,837 in September and 651,086 in October last year, according to a report from the Census Bureau. Exports of raw cotton from the United States, according to the Bureau of Foreign and Domestic Commerce, amounted to 799,000 bales in October, as compared with 617,000 bales in the preceding month and 861,000 in October, 1936.

Fabrics

The cloth markets, following general business trends, were generally inactive during the past month. Many mills have reduced their operating schedule to four days per week or less. Among the restrictive influences is the possibility of an assessment on fabric floor stocks. The raincoat fabric business has shown recent improvement, and manufacturers have been selling fair quantities to the Christmas trade.

Current prices are somewhat easier and quite favorable in relation to the present cost of raw cotton. Drills, ducks, and osnaburgs registered reductions of from ⅛¢ to 2¼¢ per yard. Sheeting prices receded ⅛¢ to ½¢ per yard, and raincoat fabrics were off ½ to ¾¢ per yard. Tire fabrics prices, however, did not reflect this easier trend. Two gains were registered; while other prices remained steady.

N. Y. Quotations

(*Continued from page* 84)

Reodorants

Amora A	lb.	
B	lb.	
C	lb.	
D	lb.	
Curodex 19	lb.	$2.75
188	lb.	3.50
198	lb.	4.50
Paradors	lb.	
Rodo No. 0	lb.	
No. 10	lb.	

Rubber Substitutes

Black	lb.	.0775/$0.135
Brown	lb.	.085 / .14
White	lb.	.095 / .1525
Factice		
Amberex	lb.	.20
Brown	lb.	.085 / .15
Neophax A	lb.	.13
B	lb.	.135
Fac-Cel B	lb.	.18
C	lb.	.18
White	lb.	.095 / .16

Softeners

Burgundy pitch	lb.	.06
Cycline oil	gal.	.20
Nuba Resinous pitch (drums)		
Grades No. 1 and No. 2	lb.	.03
Grade No. 3	lb.	.04
Palm oil (Witco), c.l.	lb.	.0575
Pine tar	gal.	
Plastogen	lb.	
Plastone	lb.	.30 / .35
R-19 Resin (drums)	lb.	10
R-21 Resin (drums)	lb.	.10
Reogen	lb.	
Rosin oil, compounded	gal.	.40
RPA No. 1	lb.	
No. 2	lb.	
Rubtack	lb.	.10
Tackol	lb.	.115
Tonox	lb.	.16
Powder	lb.	
Witco No. 20	gal.	.20
X-1 Resinous oil (tank car)	lb.	.01

Softeners for Hard Rubber Compounding

Resin C Pitch 55° C. M.P.	lb.	.013 / .014
Resin C Pitch 70° C. M.P.	lb.	.013 / .014
Resin C Pitch 85° C. M.P.	lb.	.013 / .014

Solvents

Beta-Trichlorethane	gal.	
Bondogen	lb.	
Carbon bisulphide	lb.	
tetrachloride	lb.	
Industrial 90% benzol (tank car)	gal.	.16

Stabilizers for Cure

Laurex, ton lots	lb.	
Stearex B	lb.	.105 / .115
Beads	lb.	.095 / .105
Stearic acid, single pressed	lb.	.105 / .115
Stearite	100 lbs.	9.50 /10.50
Zinc stearate	lb.	.23

Synthetic Rubber

Neoprene Latex Type 50	lb.	
53	lb.	
54	lb.	
Type E.	lb.	
"Thiokol" A (f.o.b. Yardville)	lb.	.35
Coating Materials	gal.	2.50 / 5.00
DX	lb.	.55
Molding Powder	lb.	.50 / .75

Tackifier

B. R. H. No. 2	lb.	.015 / .016

Varnish

Shoe	gal.	1.45

Vulcanizing Ingredients

Sulphur		
Chloride, drums	lb.	.035 / .04
Rubber	100 lb.	2.65
Telloy	lb.	
Vandex	lb.	

(See also Colors—Antimony)

Waxes

Carnauba, No. 3 chalky	lb.	.37½
2 N.C.	lb.	.39¾
3 N.C.	lb.	.37½
1 Yellow	lb.	.4575
2	lb.	.4425
Montan, crude	lb.	.11

Handling the job of Special Specifications
FOR COTTON FABRICS

Entrance to the new Shawmut Laboratory—West Point, Ga.

Horizontal Testing Machine recording breaking strength of a fabric.

Micro-photographic apparatus—important in certain kinds of analysis.

Weave shed of the Lanett Mill, West Point, Ga.—2090 looms in this one room!

THE accumulated knowledge of our engineering and mill departments and our extensive laboratory facilities which now include the new Shawmut laboratory, are at the disposal of rubber manufacturers.

In addition to the usual constructions of hose and belting ducks, sheetings and osnaburgs, our engineers have been able to help materially in the development of special fabrics for particular requirements.

With the added facilities of this newest laboratory, we are better equipped than ever before to handle the job of making cotton fabrics that will be consistently uniform and true to specifications.

WELLINGTON SEARS COMPANY
65 Worth Street, New York, N. Y.

New Publications

(*Continued from page 74*)

sections as follows: (1) itinerary of the tour in the form of a brief summary of the writer's diary; (2) survey of the evidence available regarding the value of budgrafts and so-called "clonal" seed as forms of planting material; (3) notes on the agricultural conditions and practices in the three countries visited; (4) a few remarks on rubber research.

"Condor Compensated Belts." The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J. 4 pages. In addition to describing the reason for compensating rubber belts and the Compensated Principle, this folder explains the advantages of this type of belt. Engineering data essential to the proper selection and application of belts are also included.

"Annual Report, 1936." The Rubber Research Institute of Malaya, Kuala Lumpur, F. M. S. 158 pages. This annual report which covers the activities of the R.R.I. of Malaya during the year 1936, includes reports from the following divisions: soils, botanical, pathological, chemical, and experiment station. The fire which destroyed the chemical laboratory and a large amount of unpublished research data hampered the work of the chemical division considerably during 1936. Research data on the following subjects are contained in the chemical report: latex constituents, latex preservation, latex concentration, copper in latex, modified rubbers, clone rubber, and the drying of rubber.

"Synthetic Organic Chemicals." Carbide & Carbon Chemicals Corp., 30 E. 42nd St., New York, N. Y. 78 pages. The revised 1937 edition of this catalog gives the specifications, properties, and a description of the use of more than 80 organic chemical products of Carbide & Carbon Chemicals Corp. The chemicals are classified as alcohols, glycols, alcohol-ethers, ethers and oxides, aldehydes, ketones, esters, acids and anhydrides, chlorinated compounds, amines, "Vinylite" resins, activated carbon, and hydrocarbon gases. The new edition contains, in addition to a product index, a new application index to assist in finding references to particular uses of these chemicals.

"The Safe Worker." National Safety Council, 20 N. Wacker Dr., Chicago, Ill. 16 pages. The October issue of this magazine, through a series of short items, points out safety procedures to be used in various types of work. Cartoons that illustrate accidents or their causes and brief humorous remarks are found throughout the magazine. A daily time record which covers the period of one month is also included.

"Women in the United States." United States Department of Labor. Washington, D. C. 137 pages. This report is based on a factual study made at the request of the officers of ten national organizations of women. It presents a general compilation of data on the economic situation of women in the United States. Part One deals with women's opportunity for a livelihood; while Part Two discusses the experience of women under labor legislation.

Trade Marks

(*Continued from page 77*)

351,389. **Conqueror.** Golf balls. Kasselberg-Griffith Corp., Chicago, Ill.
351,390. **Challenger.** Golf balls. Kasselberg-Griffith Corp., Chicago, Ill.
351,432. **Kable Kord.** Power transmission belts. L. H. Gilmer Co., Tacony, Philadelphia, Pa.
351,450. Representation of a man containing the words: **"It's a Graeme Harrison Product."** Rubber cements and adhesive tapes. Graeme Harrison Products, Inc., New York, N. Y., assignor, by mesne assignments, to Van Cleef Bros., Chicago, Ill., a copartnership composed of N., M., F., and P. Van Cleef.
351,509. **Nevoll.** Semi-viscous oil. Neville Co., Neville Island, Pa.
351,555. **Plastone.** Adhesion-preventing material for vulcanizing molds. C. J. Harwick, doing business as Standard Chemical Co., Akron, O.
351,642. Triple circle containing the letters **"R-1."** Tires and inner tubes. Goodyear Tire & Rubber Co., Akron, O.
351,716. **Tuffball.** Golf balls. Worthington Ball Co., Elyria, O.
351,829. Representation of a man stretching elastic and the number **"17."** Elastic fabrics. C. A. Cosman, New York, N. Y.
351,855. **Corporal.** Storage batteries. General Tire & Rubber Co., Akron, O.
351,873. **Maiden Form.** Garter belts, corsets, corselets, etc. Maiden Form Brassiere Co., Inc., New York, N. Y.
351,883. **Mold Form.** Girdles, corsets, and corselets. Mold Form Brassiere, Inc., New York, N. Y.
351,891. **Gasaver.** Spark plugs. Dunlop Tire & Rubber Corp., Buffalo, N. Y.
351,898. **Crackerjacks.** Suspenders. Gluckauf Co., Inc., New York, N. Y.
351,905. **Windsor.** Heels, taps, and soles. Hagerstown Rubber Co., Hagerstown, Md.
351,923. **Hatkerchiefs.** Hat protectors. R. H. Macy & Co., Inc., New York, N. Y.
351,954. **Boltar.** Combs. Bolta Rubber Co., Inc., Lawrence, Mass.
351,974. **"Nemo-Let."** Foundation garment and girdles. Kops Brothers, Inc., New York, N. Y.
352,000. **L'Attice.** Girdles, corsets, etc. Graceform Corset Co., Inc., New York, N. Y.
352,025. **Master Molde.** Corsets. Mastercraft Specialties, Inc., New York, N. Y.
352,055. **Controleur.** Girdles and foundations. Strouse, Adler Co., New Haven, Conn.
352,058. **Biaislastique.** Corsets. Franco Corset Co., New York, N. Y.
352,072. **Minimums.** Girdles, etc. William Carter Co., Needham Heights, Mass.

Transparent Rubber

When a pure gum stock of rubber and sulphur is vulcanized, it has a high degree of clarity, but on the other hand it exhibits poor physical properties and its cost is relatively high. In order to obtain rubber products which are both transparent and have good physical properties, a compounding ingredient, known as "Carp Brand" magnesium carbonate (made in Japan), has been developed. When compounded with rubber, even in relatively large amounts, it is claimed that it will not destroy the original transparency of the pure gum stock. This property is due to the fact that it has essentially the same refractive index as that of vulcanized rubber. Through a special manufacturing process the carbonate is produced as minute globules. Because of this particle size and shape, the necessary and desirable physical qualities are said to be imparted to the finished product. This magnesium carbonate is recommended for the manufacture of crepe soles, transparent bicycle tires, rubber bands, and rubber products which are required to allow a high degree of light transmission.

World Net Imports of Crude Rubber

Year	U.S.A.	U.K.†	Australia	Belgium	Canada	Czechoslovakia	France	Germany	Italy	Japan	Russia	Rest of the World	Total
1935	455,800	175,100	10,000	7,600	26,900	11,200	52,300	62,900	26,100	57,600	37,600	59,100	935,900
1936	475,361	62,676	14,423	9,627	27,867	8,772	56,777	71,793	16,534	61,701	30,967	64,647	831,684
1937													
Jan.	42,655	3,855	590	854	1,632	567	4,701	7,041	1,770	8,298	2,633	5,959	76,458
Feb.	44,398	6,081	331	1,363	1,271	837	5,276	7,911	1,502	6,605	3,048	5,068	77,388
Mar.	39,888	7,197	1,293	1,641	2,612	601	5,359	7,668	2,119	6,914	3,598	6,172	78,208
Apr.	42,066	9,871	1,058	1,069	1,343	1,445	5,302	8,664	1,669	5,808	1,532	5,843	79,607
May	48,506	8,488	1,287	2,113	4,187	925	5,619	6,706	2,771	8,597	1,886	6,244	94,941
June	48,972	10,437	2,258	1,630	3,790	1,150	6,022	6,469	1,958	7,608	3,940	6,127	95,081
July	43,018	13,854	1,959	851	1,946	754	4,315	7,860	2,719	4,869	2,150	5,865	86,934
Aug.	49,485	18,483	2,114	1,013	3,506	1,692	4,498	8,752	2,568	4,411	1,226	5,655	100,677

*Estimate. †U.K. figures show gross imports, not net imports. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

GENERAL RATES	SITUATIONS WANTED RATES	SITUATIONS OPEN RATES
Light face type $1.00 per line (ten words)	Light face type 40c per line (ten words)	Light face type 75c per line (ten words)
Bold face type $1.25 per line (eight words)	Bold face type 55c per line (eight words)	Bold face type $1.00 per line (eight words)

Allow nine words for keyed address. *Replies forwarded without charge.*

SITUATIONS WANTED

GENERAL FOREMAN: PRACTICAL MAN WITH EXPERIENCE in rubberizing all kinds of fabrics on spreader and calender, shoe goods, raincoat and hospital sheetings, silks, quarter lining. Address Box No. 907, care of INDIA RUBBER WORLD.

EXPERIENCED COMPOUNDER, CHEMIST OR SUPERINTENDent, with real practical and technical knowledge based on fifteen years of successful experience in soft and hard rubber mechanicals, automotive and aviation products of every description, covered rolls, lathe cut work, oil resisting stocks for all purposes. Best of references. Address Box No. 902, care of INDIA RUBBER WORLD.

EXPERIENCED COMPOUNDER AND CHEMIST: CAPABLE OF taking complete charge of compounding, testing, developing new stocks, factory control. Thorough knowledge of modern compounding and economic production methods, including wide variety of rubber products, also Neoprene and "Thiokol" products. Best of references. Address Box No. 903, care of INDIA RUBBER WORLD.

LATEX COMPOUNDER, YOUNG CHEMICAL ENGINEER, AGE 24, graduate Cooper Union. Several years' experience latex products. Desires any reasonable connection. Address Box No. 904, care of INDIA RUBBER WORLD.

CHEMIST, AGE 31, WITH 8 YEARS' LATEX EXPERIENCE, development and control laboratory, factory management, technical sales, thorough knowledge latex compounding and uses, desires position of responsibility, latex research preferred. Now employed. Good references. Will go anywhere in States. Address Box No. 906, care of INDIA RUBBER WORLD.

GENERAL FOREMAN. PRACTICAL MAN WITH 15 YEARS OF experience in rubberizing all kinds of fabrics for automotive manufacturers and for upholstery materials. Employed at present. Desires new permanent connection. Best of reasons for seeking change. Address Box No. 901, care of INDIA RUBBER WORLD.

EXECUTIVE, NOW EMPLOYED, AGE THIRTY-NINE, DESIRES change. Eighteen years' experience in manufacturing mechanical rubber goods. Capable of handling development department, factory cost and specification-estimation department as well as compounding for rubber or synthetic rubber goods. Can also handle labor. Address Box No. 908, care of INDIA RUBBER WORLD.

SITUATIONS OPEN

WANTED: A SALESMAN TO HANDLE MOLDED HARD RUBBER products as a side line. Address Box No. 894, care of INDIA RUBBER WORLD.

SITUATIONS OPEN—Continued

WANTED: AN EXPERIENCED GENERAL FOREMAN, WHO knows calender work, rubberizing, friction tape and hospital sheeting, for factory located in East. Address Box No. 896, care of INDIA RUBBER WORLD.

WANTED: CHEMIST WITH MANUFACTURING EXPERIENCE with rubber compound, asbestos packings, clutch facings, and brake lining saturants. Address Box No. 897, care of INDIA RUBBER WORLD.

WANTED: SALESMAN TO REPRESENT MANUFACTURERS OF molded rubber goods for custom molding. Our low overhead enables us to quote low prices. Commission basis. Address Box No. 898, care of INDIA RUBBER WORLD.

WANTED BY SMALL HOLLOW RUBBER SPECIALTY MANUfacturer: production manager with knowledge of rubber compounding. Write stating experience and salary expected to Box No. 900, care of INDIA RUBBER WORLD.

WANT SUPERINTENDENT WITH BROAD GENERAL EXPERIence capable of managing factory producing 1,000 tires daily. State age, training, and experience. Reply to Box No. 905, care of INDIA RUBBER WORLD.

AN OLD ESTABLISHED DIP GOODS COMPANY WANTS A working foreman who is thoroughly experienced in the manufacture of latex balloons. Reply stating age, experience, salary required. Splendid opportunity for the right man. Address Box No. 909, care of INDIA RUBBER WORLD.

BUSINESS OPPORTUNITIES

FACTORY FOR RENT

Equipment includes three mills, calender, and presses. Inquire: The Buxbaum Company, Akron, Ohio.

THE PROPRIETORS OF U. S. A. PATENT NO. 2,051,940 RELATing to rubber buckets are prepared to either grant licenses for manufacture and sale of this article or would be prepared to sell the rights for a reasonable amount. Address inquiries to: H. G. Miles, Ltd., Works Road, Letchworth, Hertfordshire, England.

WANTED: TO ENTER IN PARTNERSHIP WITH A RUBBER company of about $10,000 capital. Willing to buy out. Write giving full details to E. Daniels, 227 Concord St., Brooklyn, N. Y.

INTERNATIONAL PULP CO.
41 Park Row, NEW YORK, N. Y.
SOLE PRODUCERS
ASBESTINE
REG. U. S. PAT. OFF.

We Have a Completely Equipped Plant for Manufacturing
RUBBER SPECIALTIES
Backed by years of experience.
Let us quote on your requirements without obligation, of course.
ADMIAR RUBBER CO.
273 Van Sinderen Ave., Brooklyn, N. Y.
Division of Ideal Novelty & Toy Co., Inc.
Long Island City, New York

Thoroughly Rebuilt and Guaranteed
RUBBER MILL MACHINERY
We Operate Our Own Machine Shops

Accumulators
Calenders
Cutting Machines
Spreaders
Vulcanizers
Tubers
Mills
Pumps
Mixers
Churns
Motors
Presses

Offices and Warehouses
336 Whitehead Rd.
TRENTON, N. J.
Adams, Arch and Union Sts.
AKRON, OHIO
European Office and Representative:
Mr. Andre Berjonneau, No. 33 Blvd. des Batignolles, 33, Paris (VIII) France.

L. ALBERT & SON

(*Advertisements continued on page* 91)

British Malaya

An official cable from Singapore to the Malaya Information Agency, Malaya House, 57 Trafalgar Sq., London, W.C.2, England, gives the following figures for October, 1937:

Rubber Exports: Ocean Shipments from Singapore, Penang, Malacca, and Port Swettenham

To	Sheet and Crepe Rubber Tons	Latex, Concentrated Latex, Revertex, and Other Forms of Latex Tons
United Kingdom	7,451	596
United States	34,055	531
Continent of Europe	11,018	500
British possessions	3,259	10
Japan	395	16
Other countries	1,488	..
Totals	57,666	1,653

Rubber Imports: Actual, by Land and Sea

From	Dry Rubber Tons	Wet Rubber (Dry Weight) Tons
Sumatra	5,449	830
Dutch Borneo	1,402	72
Java and other Dutch islands	198	4
Sarawak	469	..
British Borneo	611	34
Burma	58	8
Siam	1,837	428
French Indo-China	196	141
Other countries	111	10
Totals	10,331	1,527

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

No.	Inquiry
2389	Supplier of lacquer to paint rubber hose.
2390	Manufacturer of rubber latex pads or air-filled sheeting cushions.
2391	Manufacturer of flexible rubber flat Bibb washers (faucet washers).
2392	Manufacturer of raincoats.
2393	Manufacturer of rubber toothbrushes.
2394	Manufacturer of rubber paving blocks.
2395	Supplier of fairly hard balata resin.
2396	Information wanted on "Rubbone."
2397	Supplier of Paraweld.
2398	Supplier of Parafilm.
2399	Manufacturer of electric tire retreading and repairing molds.
2400	Manufacturer of skiving machines for removing worn-off tire covers.
2401	Manufacturer of rubber bottle stopper known as Quick Seal.
2402	Manufacturer of rubber adhesives.
2403	Manufacturer of cold adhesive for attaching rubber to rolled steel, preferably one which will, when dry, vulcanize at room temperature.
2404	Manufacturer of rubber vacuum cups for car aerials.
2405	Information wanted on salvaging pneumatic tires and tubes.
2406	Manufacturer of equipment for making mats from worn tires.
2407	Manufacturer of hand or hydraulic press to take a mold about eight by ten inches, for soft rubber purposes.

Cuba

Cuban presidential decree No. 2,859, promulgated September 29, 1937, establishes a new customs tariff subitem (78-E) to apply to rubber in rolls or sheets, imported as a raw material for the manufacture of articles, with an import duty to the United States of 7.15¢ per kilo, plus a surtax of 3% of the duty, according to a recent report from Assistant Commercial Attaché Charles H. Ducote, Habana. Rubber sheets and strip for retreading automobile tire casings, formerly dutiable under Cuban customs item No. 307-K with an import duty to the United States of 16.25¢ per kilo, plus a surtax of 3% of the duty, will be dutiable under the above new subitem.

Cuban customs circular No. 1,437, of September 24, 1937, provides that tubular girdles of elastic cotton and rayon knitted fabrics will be classified under customs tariff item 137-B, with a rate of duty to the United States of $1.225 per net kilo, plus a surtax of 10% of the duty, according to a report from the Office of the American Commercial Attaché, Habana. Formerly girdles were dutiable under tariff item 137-C at $3.85 per net kilo, plus the 10% surtax, but hereafter only girdles which by reason of size or weight should be classified as "small articles" will be classified under tariff item 137-C at the higher rate of duty. *Commerce Reports.*

U. S. Crude and Waste Rubber Imports for 1937

	Plantations	Latex	Paras	African	Centrals	Manicoba and Guayule	Manicoba and Matto Grosso	Totals 1937	Totals 1936	Balata	Miscellaneous Waste
Jan. ....tons	30,674	1,171	625	167	23	160	..	32,820	31,292	13	383	201
Feb.	40,326	2,100	717	15	2	129	..	43,289	35,219	37	1,300	217
Mar.	48,367	2,117	1,285	47	11	212	..	52,039	37,451	21	894	572
April	33,147	1,683	734	79	17	190	..	35,850	40,370	6	283	99
May	48,196	1,809	612	46	2	175	..	50,840	35,598	44	669	868
June	45,680	2,678	318	70	22	188	..	48,956	41,835	47	641	374
July	36,315	2,154	140	75	11	413	..	39,108	35,881	44	726	307
Aug.	46,627	1,460	120	283	2	293	..	48,785	42,562	14	513	266
Sept.	53,942	1,395	229	146	8	329	..	56,049	48,386	55	738	72
Oct.	49,915	2,085	266	31	41	170	..	52,508	40,920	58	524	197
Total 10 mos., 1937 ....tons	433,189	18,652	5,046	959	139	2,259	..	460,244	.....	339	6,671	3,173
Total 10 mos., 1936 ....tons	370,284	13,700	3,332	904	359	935	..	.....	389,514	903	6,541	1,865

Compiled from The Rubber Manufacturers Association, Inc., statistics.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Anaconda Wire & Cable Co.	Com.	$1.00	Nov. 20	Nov. 13
Baldwin Rubber Co.	Com.	$0.12½ q.	Jan. 20	Jan. 15
Boston Woven Hose & Rubber Co.	Com.	$3.00 s.	Dec. 15	Dec. 1
Brown Rubber Co.	Com.	$0.15 q.	Dec. 15	Dec. 1
Brown Rubber Co.	Com.	$0.10 extra	Dec. 15	Dec. 1
Canada Wire & Cable Co.	Pfd.	$6.75 accum.	Dec. 1	Nov. 18
Dewey & Almy Chemical Co.	$7 pr. Pfd.	$1.75 q.	Dec. 15	Dec. 10
Dewey & Almy Chemical Co.	$7 Cl. B Pfd.	$1.75 q.	Dec. 15	Dec. 10
Faultless Rubber Co.	Com.	$0.50 q.	Jan. 1	Dec. 15
Firestone Tire & Rubber Co.	Pfd.	$1.50 q.	Dec. 1	Nov. 15
B. F. Goodrich Co.	$5 Pfd.	$1.25 q.	Dec. 22	Dec. 17
Goodyear Tire & Rubber Co.	$5 Conv. Pfd.	$1.25	Dec. 15	Nov. 15
Goodyear Tire & Rubber Co.	Com.	$0.50	Dec. 15	Nov. 15
Hewitt Rubber Corp.	Com.	$0.25 q.	Dec. 6	Nov. 24
Martin Custom-Made Tires	8% Pfd.	$0.10 q.	Dec. 15	Dec. 1
Mid-West Rubber Reclaiming Co.	$4 Pfd.	$1.00 q.	Dec. 1	Nov. 20
Pahang Rubber Co., Ltd.	Com.	$0.25 q.	Dec. 6	Nov. 26
Pharis Tire & Rubber Co.	Com.	$0.15 q.	Nov. 20	Nov. 5
Raybestos-Manhattan, Inc.	Com.	$0.50	Dec. 15	Nov. 30
Thermoid Co.	$3 Pfd.	$0.75 q.	Dec. 15	Dec. 2
Tyer Rubber Co.	6% Pfd.	$1.50 q.	Nov. 15	Nov. 10
United Elastic Corp.	Com.	$0.15 irregular	Dec. 24	Dec. 3

Shipments of Crude Rubber from Producing Countries

Year	Malaya including Brunei and Labuan	N.E.I.	Ceylon	India	Burma	North Borneo	Sarawak	Siam	French Indo-China	Total	Philippines and Oceania	Africa	South America	Mexican Guavule	Grand Total
1935	417,000	282,900	54,300	9,100	4,900	8,900	19,300	28,300	28,700	853,400	1,500*	5,000	12,200	500	872,600
1936	353,667	309,630	49,685	8,648	5,859	8,177	21,013	34,578	40,769	832,026	1,619*	6,122	14,632	1,228	855,627
1937															
Jan.	24,746	27,132	4,514	487	579	1,234	4,015	3,849	2,823	69,379	80	635	1,286	160	71,540
Feb.	24,138	26,770	5,603	1,033	843	790	2,015	3,554	3,081	67,827	180	537	1,789	206	70,539
Mar.	40,138	40,929	7,049	885	1,149	1,239	1,425	3,873	3,160	99,847	181	472	1,792	136	102,428
Apr.	41,696	33,136	3,419	627	559	783	2,960	1,899	2,098	87,177	124	574	1,546	190	89,611
May	33,929	38,828	4,607	445	562	778	742	2,238	2,888	85,017	98	676	1,057	182	87,030
June	31,376	47,387	5,149	662	430	813	1,890	2,933	3,673	94,313	117	621	915	145	96,111
July	45,900	44,240	6,279	703	263	1,414	2,543	3,175	5,563	110,080	111	872	940	371	112,374
Aug.	43,281	40,838	7,308	471	134	1,189	1,624	2,999	2,277	100,121	187	600*	1,314	335	102,557
Sept.	48,515	38,331	5,802	957	100*	969	2,659	3,173	4,131	104,637	200*	600*	1,060	200*	106,697

*Estimate. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

Classified Advertisements

Continued

MACHINERY AND SUPPLIES FOR SALE

FOR SALE: ONE FARREL 3-ROLL CALENDER 16″ BY 42″, SPLIT bearing type. Rolls good shape, assembled reductions, 50 h.p. slip ring motor. Address Box No. 895, care of INDIA RUBBER WORLD.

ONE 1,000 GALLON DISTILL MANUFACTURED BY THE ERNEST Scott Co., Fall River, Mass. Purchased new in 1926. Relined two years ago. Now used in dry cleaning plant. Can be seen in operation and purchased cheap. Write: The American Laundry Machinery Co., Kenilworth, N. J.

FOR SALE: COMPLETE LINE OF USED RUBBER EQUIPMENT including mills, calenders, hydraulic presses, vulcanizers, Banbury mixers, driers, etc. Send for complete list. CONSOLIDATED PRODUCTS CO., INC., 13-16 Park Row, New York, N. Y.

MACHINERY AND SUPPLIES WANTED

INTERESTED PURCHASING SCOTT TESTING MACHINE AND laboratory mill-calender unit. Address Box No. 899, care of INDIA RUBBER WORLD.

WANTED: FOR OUR EXPANSION PROGRAM, GOOD USED equipment including Experimental Machines, Large Size Mills and Calenders, Tubers, Hydraulic Presses and a Banbury Mixer, etc. Advise us of your offerings. Address Box No. 910, care of INDIA RUBBER WORLD.

MISCELLANEOUS

METAL-BOND CEMENT. ADAPTED FOR UNITing rubber or other materials to metal, wood, glass, or any surface with which it is usually difficult to secure a satisfactory bond. KENNETH R. ELWELL, La Grange, Ill.

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Chemists—Engineers
Every form of Chemical Service
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215 N. Calvert Street, Baltimore, Maryland

"ANNALS OF RUBBER"
A Chronological Record of the Important Events in the History of Rubber
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INDIA RUBBER WORLD
420 Lexington Avenue New York, N. Y.

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Advantages of Porotex Treatment
1. All compounds stripped easily.
2. Wrinkles never cause liners to crack.
3. Liners do not rot as treatment renders them heat-proof and oil-proof.
4. Liners remain porous, reducing tendency to trap air.

POROTEX PRODUCTS
580 East 140th Street Cleveland, Ohio

BARBER *Genasco* (M.R.) Hydrocarbon
(SOLID OR GRANULATED)
A hard, stable compound—produced under the exacting supervision of an experienced and up-to-date laboratory.
Aging tests have proved Genasco to be *always* of uniform quality. Shipped to all parts of the world in metal drums. Stocks carried at Maurer, N. J. and Madison, Ill.
THE BARBER COMPANY, INC.
New York Philadelphia Madison, Ill. Chicago

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Manufacturers of
SPIRAL WRAPPING MACHINES
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Purer and cheaper than you can produce it and you avoid the ever present fire risk. Dependable deliveries. Sample on request.
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Washed and Dry, Ready for Compounding
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ADVERTISING PAGES REMOVED

United States Statistics

Imports for Consumption of Crude and Manufactured Rubber

	August, 1937		Eight Months Ended August, 1937	
UNMANUFACTURED—*Free*	Pounds	Value	Pounds	Value
Crude rubber	107,564,546	$20,593,314	779,984,879	$150,097,171
Liquid latex	4,033,306	838,778	34,579,020	6,961,068
Jelutong or pontianak	813,207	107,611	9,025,677	988,317
Balata	36,147	5,876	583,465	116,193
Gutta percha	78,138	21,603	1,269,391	256,389
Guayule	749,300	95,893	3,860,300	483,074
Siak	102,953	9,880	325,636	28,954
Scrap and reclaimed	1,410,575	59,871	10,215,309	320,274
Totals	114,788,172	$21,734,826	839,843,677	$159,251,440
Chicle, crude—*Free*	155,458	$40,297	7,675,135	$2,188,882
MANUFACTURED—*Dutiable*				
Rubber tires—*number*	8,277	$7,621	54,415	$96,637
Rubber boots, shoes, and overshoes—*pairs*	836	449	23,035	11,130
Rubber soled footwear with fabric uppers—*pairs*	57,168	11,774	634,462	168,281
Golf balls—*number*	23,388	3,233	480,798	55,550
Lawn tennis balls—*number*	468	38	302,298	26,224
Other rubber balls—*number*	87,418	3,220	4,002,207	134,567
Other rubber toys, except balls	57,282	9,023	614,210	87,895
Hard rubber combs—*number*	100,744	6,097	572,520	36,431
Other manufactures of hard rubber	.....	1,059	.....	24,765
Friction or insulating tape	245	49	106,530	6,003
Belts, hose, packing, and insulating material	.....	35,263	.....	188,510
Druggists' sundries of soft rubber	.....	7,193	.....	55,442
Inflatable swimming belts, floats, etc.—*number*	257	42	864,791	57,576
Other rubber and gutta percha manufactures—*lb.*	126,477	27,613	1,171,204	256,323
Totals	.....	$112,674	.....	$1,205,334

Exports of Foreign Merchandise

RUBBER AND MANUFACTURES				
Crude rubber	1,499,760	$265,298	14,296,059	$2,774,936
Balata	18,893	5,228	509,618	147,507
Gutta percha, rubber substitutes, and scrap	75,047	11,347	521,201	109,022
Rubber manufactures	.....	611	.....	17,125
Totals	.....	$282,484	.....	$3,048,590

Exports of Domestic Merchandise

RUBBER AND MANUFACTURES				
Reclaimed—*lb.*	2,777,677	$139,109	18,421,614	$855,377
Scrap—*lb.*	7,271,938	133,726	58,463,420	1,131,605
Cements—*gal.*	25,268	24,219	227,839	201,693
Rubberized automobile cloth, *sq. yd.*	35,391	16,810	426,556	189,650
Other rubberized piece goods and hospital sheeting—*sq. yd.*	158,995	65,728	1,278,050	544,833
Footwear				
Boots—*pairs*	3,618	9,071	61,820	141,426
Shoes—*pairs*	9,121	4,733	177,281	90,010
Canvas shoes with rubber soles—*pairs*	42,191	27,045	334,150	197,706
Soles—*doz. prs.*	5,916	10,859	29,085	57,040
Heels—*doz. prs.*	32,378	16,509	418,401	245,514
Soling and top lift sheets	40,290	6,477	464,537	86,159
Gloves and mittens—*doz. prs.*	6,920	15,292	56,172	122,981
Water bottles and fountain syringes—*number*	41,788	16,643	211,677	82,942
Other druggists' sundries	.....	60,724	.....	399,603
Gum rubber clothing—*doz.*	23,736	46,209	230,946	391,045
Balloons—*gross*	27,813	24,782	300,174	221,297
Toys and balls	.....	22,329	.....	104,777
Bathing caps—*doz.*	2,500	4,042	43,937	68,244
Bands—*lb.*	29,522	12,323	199,716	81,136
Erasers—*lb.*	32,916	17,338	276,059	156,718
Hard rubber goods				
Electrical battery boxes	22,946	16,046	205,291	120,336
Other electrical—*lb.*	18,413	6,009	300,128	67,501
Combs, finished—*doz.*	4,303	3,362	80,237	51,560
Other hard rubber goods	.....	32,068	.....	172,905
Tires				
Truck and bus casings, *number*	29,070	537,510	141,403	2,782,836
Other automobile casings, *number*	65,405	670,697	553,417	5,796,768
Tubes, auto—*number*	62,588	95,230	449,825	679,690
Other casings and tubes, *number*	8,206	49,540	54,586	399,650
Solid tires for automobiles and motor trucks—*number*	308	12,694	2,926	85,030
Other solid tires	98,081	16,584	721,498	114,520
Tire sundries and repair materials	.....	53,401	.....	575,841
Rubber and friction tape—*lb.*	52,006	15,680	544,929	146,250
Fan belts for automobiles—*lb.*	55,729	28,864	533,657	295,820
Other rubber and balata belts—*lb.*	254,495	145,446	2,181,471	1,148,101
Garden hose—*lb.*	72,548	13,820	668,754	133,736
Other hose and tubing—*lb.*	446,815	175,828	3,707,882	1,419,499
Packing	146,114	66,464	1,246,926	542,451
Mats, matting, flooring, and tiling	101,297	15,322	807,981	124,282
Thread	32,396	19,607	540,756	278,851
Gutta percha manufactures	171,284	46,442	896,806	253,172
Other rubber manufactures	.....	78,656	.....	884,928
Totals	.....	$2,773,238	.....	$21,443,483

Rubber Goods Production Statistics

	1937 Aug.	1936 Aug.
Tires and Tubes*	....	....
MISCELLANEOUS PRODUCTS		
Single and double texture proofed fabrics		
Production—*thous. of yds.*	3,802	4,145
Rubber and canvas footwear		
Production, total—*thous. of prs.*	6,454	5,588
Tennis—*thous. of prs.*	1,789	1,377
Waterproof—*thous. of prs.*	4,666	4,212
Shipments, total—*thous. of prs.*	7,424	6,877
Tennis—*thous. of prs.*	1,190	1,443
Waterproof—*thous. of prs.*	6,234	5,435
Shipments, domestic, total—*thous. of prs.*	7,363	6,851
Tennis—*thous. of prs.*	1,142	1,420
Waterproof—*thous. of prs.*	6,222	5,431
Stocks, total, end of month—*thous. of prs.*	20,746	16,626
Tennis—*thous. of prs.*	4,990	3,615
Waterproof—*thous. of prs.*	15,757	13,010

*Monthly data no longer available; quarterly figures will be shown starting Sept., 1937.

The above figures have been adjusted to represent 100% of the industry based on reports received which represented 81% for 1936-37.

Source: *Survey of Current Business*, Bureau of Foreign & Domestic Commerce, Washington, D. C.

Imports by Customs Districts

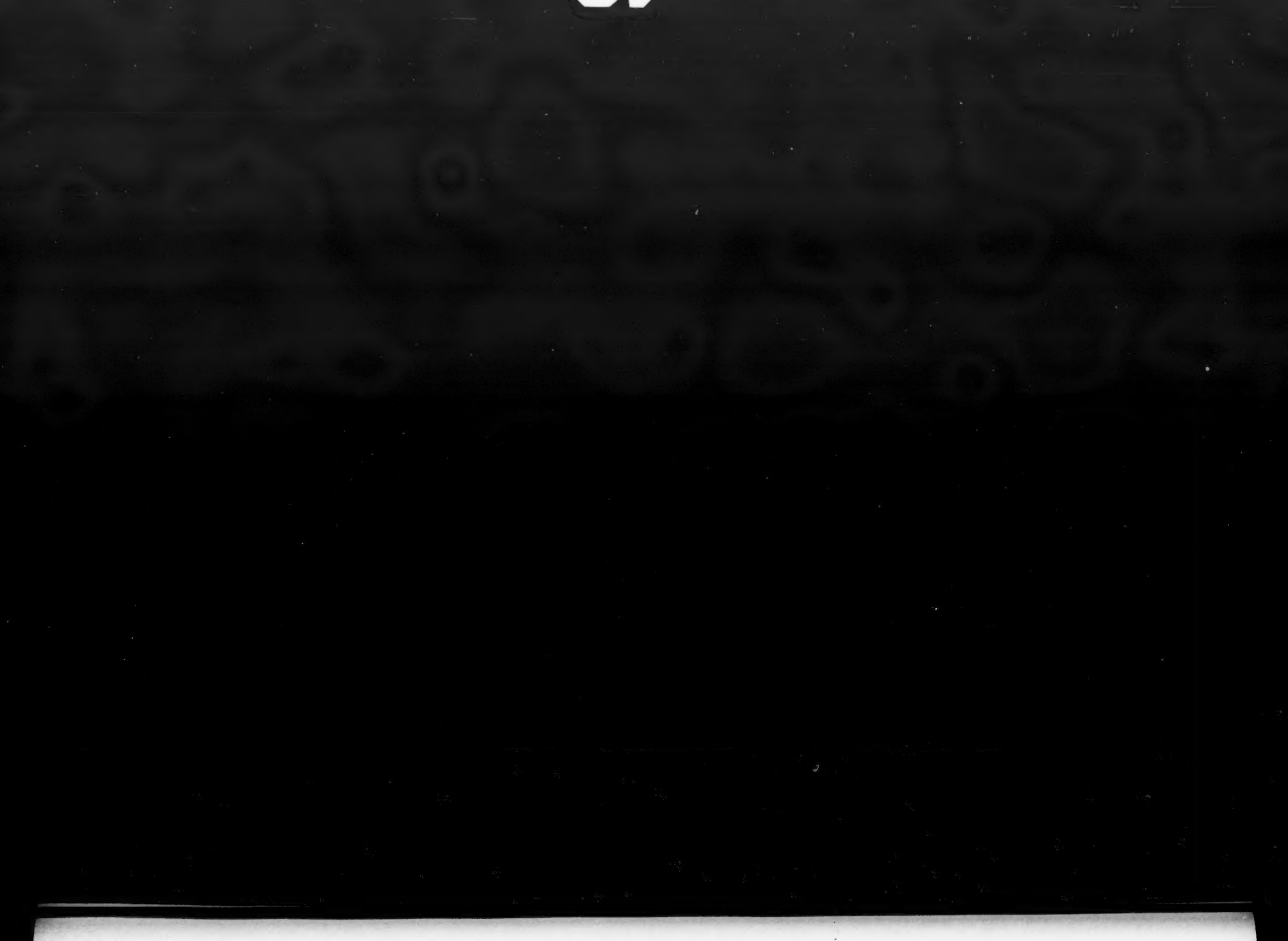
	—September, 1937— *Crude Rubber		—September, 1936— *Crude Rubber	
	Pounds	Value	Pounds	Value
Massachusetts	9,928,483	$1,798,311	6,553,653	$1,055,437
New York	88,245,144	15,622,663	90,303,229	14,243,175
Philadelphia	8,040,386	1,403,574	787,690	118,130
Maryland	5,997,338	1,065,990	696,760	84,584
Georgia	158,811	26,390	659,184	100,214
Mobile	754	127	72,681	10,390
New Orleans	3,540,694	668,364	1,254,277	181,970
Galveston	44,800	8,456	.....	.....
Los Angeles	11,756,553	2,309,814	11,539,589	1,505,088
San Francisco	672,543	121,602	422,395	64,200
Colorado	.....	.....	22,400	3,625
Ohio	85,222	23,938	.....	.....
Totals	128,470,728	$23,049,229	112,311,858	$17,366,813

*Crude rubber including latex dry rubber content

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

No.	COMMODITY	CITY AND COUNTRY
‡4,388	Automobile parts	Stockholm, Sweden
*4,399	Battery boxes	Buenos Aires, Argentina
¶4,419	General merchandise for department stores	Manila, P. I.
†4,427	Dress shields	Paris, France
*4,428	Bathing caps and corsets	Singapore, Straits Settlements
†4,431	Rubber matting, ½-inch thick	Rio de Janeiro, Brazil
†4,437	Insulators	Hengelo, Netherlands
¶4,439	Automobile and airplane parts	The Hague, Netherlands
‡4,447	Adhesive tape for sealing cans or jars, and gas masks	Cairo, Egypt
*4,449	Toys and novelties	Habana, Cuba
†4,455	Surgical goods and sheeting	La Paz, Bolivia
§4,466	Automobile parts	London, England
‡4,477	Electric fans	Bridgetown, Barbados
†4,478	Storage batteries	Stockholm, Sweden
‡4,480	Electric fans	Asuncion, Paraguay
‡4,512	Belting	Prague, Czechoslovakia
‡4,519	V-Shaped belting	Prague, Czechoslovakia
†4,520	Window stripping	Stockholm, Sweden
‡4,562	Elastic fabric	Vienna, Austria
¶4,575	Bathing goods	Kilchberg, Switzerland
‡4,614	Bathing caps	Prague, Czechoslovakia
*4,629	Elastic-thread bathing suits	London, England
†4,631	Millinery supplies, including elastic	Johannesburg, South Africa
†4,636	Sheet rubber for soles and heels	Zurich, Switzerland
*4,638	Automobile parts	Mexico City, Mexico
*4,695	Lithopone, titanium, whiting and zinc oxides	Durban, South Africa

*Agency †Purchase. ‡Purchase and agency. ¶Purchase or agency. §Exclusive agency.

WHATEVER FORM TAXES TAKE IN THEIR IMPOSITION, THEY MUST BE BORNE by the consumer; that is, mainly by the working men and fighting men of the community. It is well that they should have this fact brought home to them, and not too much disguised by the form in which the taxes are imposed. *Justice Oliver Wendell Holmes.*